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INVENTORY OF RESEARCH PROJECTS 1976-77

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Ministry
of the
Environment

The Honourable
George A. Kerr, Q.C.,
Minister

K.H. Sharpe,
Deputy Minister

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PREFACE

The Inventory of Research Projects is produced by the Research Advisory Committee with the assistance of staff of the Development and Research Group. Any questions concerning specific projects should be addressed to the Director of the Branch which initiated the study.

P. D. Foley,
Chairman,
Research Advisory Committee.

F.Y. 1976-1977

INVENTORY OF RESEARCH PROJECTS

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INTRODUCTION

ORIGIN

The Ministry first published an inventory of research and development projects in June 1973. The publication was initiated by the Deputy Minister who recognized the need for a comprehensive list of research and development projects which would be readily available to all agencies. The initial report was prepared by the Strategic Planning Branch. The Research Advisory Committee was appointed in 1975 and is now responsible for it.

PURPOSE

The purpose of this report is to promote the communication of the Ministry of the Environment's activities to the research community, and to facilitate a more efficient use of capital and human resources devoted to environmental research. It is hoped that the information contained here will assist those currently conducting studies, by providing them with access to projects in this Ministry which are related to their own. Another major objective is to foster co-operative efforts and prevent the duplication of programs, particularly among Ministries of the Ontario Government. Ultimately, the inventory and successive updates will provide a comprehensive background for the selection of environmental research priorities, revealing those areas which are already being extensively examined, and those which demand increased attention.

ORGANIZATION OF THE INVENTORY

The report consists of profiles of the individual research projects being conducted by each Branch of the Ministry in the 1976-77 fiscal year, as they were identified by the Branches themselves. It includes in-house activity, as well as grants to Universities, contract research and projects supported by joint funding.

The inventory includes:

- (1) all projects conducted outside the Ministry, through Ministry of the Environment funding;
- (2) all research carried out by the Ministry's Branches where the annual budget of the projects were in excess of \$7,500 and/or one-quarter man-year.

It is outside the objectives of the inventory to include the routine test series and studies which implement on-going management programs.

FORMAT

The projects are grouped under their funding Branches. The profiles supply the following information:

<u>Branch</u>	Ministry branch responsible for the project and who should be contacted for further information.
<u>Project Title</u>	For identification and filing.
<u>Key Words</u>	The key words relating to each project are listed alphabetically in the Index at the back of the Inventory.
<u>Principal Investigator</u>	Contact for additional information on project.
<u>Liaison Officer Supervisor or/ Senior Ministry Official</u>	Responsible for the project.
<u>Research Category</u>	Identifies whether work is done in Ministry (internal) or outside (grant or a solicited or unsolicited contract) and if project is multi-year and if concurrent to a second related project.
<u>Objective</u>	Immediate reasons for undertaking the project.
<u>Description</u>	Details of the projects focuses on the methodology employed and indicates the exact nature of the research to persons with expertise in the field. Where a set of projects have been grouped under one title, the individual projects receive separate treatment under the "Description" heading and thereafter.
<u>Duration of Project in Years</u>	Starting and Completion Dates.
<u>Budget</u>	Current year total dollars and man years for the project. These are estimates only. This information is not supplied for Fiscal Year 1976/77.

<u>Source of Funds</u>	Projects in the regular work program are funded out of normal branch budgets, those in the special category use funds set up particularly for the project and are identifiable in the Ministry budget. Most of the jointly funded projects are federal-provincial programs such as, International Joint Commission and Canada-Ontario Agreement.
<u>Reporting Procedure</u>	Whether there will be interim and/or final reports available; and when anticipated.
<u>Participation by Other Ministries</u>	This space indicates if the project is assisted from other Provincial Ministries by either funding, equipment or staff support.
<u>Remarks</u>	Special comments on the project not listed above are shown here.

The Research Advisory Committee (RAC) was created in 1975 to provide a broadly based co-ordinating and planning group for the Ministry's research program. The committee is made up of representatives of the various Ministry Branches who have research responsibilities plus a member from the Program Planning & Evaluation Branch. One of the responsibilities of the RAC is the annual publication of the Inventory of Research Projects.

Air Resources Branch

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(Results of a five-year Study)

LS-1

Identification of Organics in Industrial Effluents
Discharged into the St. Clair River

LS-2

Depth Related Oxygen Pattern

LS-3

Modification of Filtered Ammonia Analysis to Mitigate
Sample Colour and Turbidity Effects

LS-4

Evaluation of Technicon Automated Kjeldahl Digestor

LS-5

Development of an Interim Method for the Determination
of Asbestos Fibres in Water by Transmission Electron
Microscopy

LS-6

Development of an Interim Method for the Determination
of Asbestos Fibres in Air by Transmission Electron
Microscopy

LS-7

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St. Clair, 1970-1976

LS-8

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Use of Refuse Derived Fuel in Cement Kilns	RR-3

Water Resources Branch

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Ottawa

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: April 29th, 1976

PROJECT TITLE Computerisation of Design Procedures for evaluation of Wet Collector Performance.

KEY WORDS Wet collector, Scrubbers, Design, Evaluation, Efficiency

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. A.W. Gnyp, University of Windsor

LIAISON OFFICER
OR SUPERVISOR

E.T.Barrow

RESEARCH CATEGORY:

INTERNAL GRANT X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT X
CONCURRENT PROJECT X

- OBJECTIVE 1. To refine a recently developed computer program for single drop particle collection efficiencies when inertial impaction, Brownian diffusion, thermophoresis diffusophoresis and interception operate simultaneously.
2. To develop specific computer programs for cross-flow, counter-flow and cocurrent flow modes of contacting dirty gas streams with scrubbing liquids.
3. To integrate the basic contact modes into a comprehensive model applicable to commercially available wet collectors.

DESCRIPTION:

This is the further development of computer programs produced during the previous four years work, integrating rate and transport equations, and mass energy and momentum balances for the three modes of flow listed above.

Integration of these programs into a program for predicting the overall efficiencies of wet scrubbers, and development of a series of curves which may be used for the assessment of scrubber efficiency performance, with example calculations to indicate the design assessment methods.

DURATION OF PROJECT IN YEARS	5	OF WHICH PRESENT YEAR IS	5th	ESTIMATED COMPLETION DATE	Sept. 1977
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR X	SPECIAL	JOINTLY	
	WORK	MINISTRY	FUNDED	OTHER
	PROGRAM X	FUNDING	PROJECT	

METHOD OF REPORTING (1) Individual Reports covering the mechanisms concerned

RESULTS (2) Computer programs to predict efficiencies

(3) A manual containing curves for use in design assessment and indicating the manner of use.

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: NONE

REMARKS: This program will require carefully monitoring to ensure that the completion date is met.

PARTICIPATION BY OTHER MINISTRIES:

NONE



BRANCH: Air Resources

DATE: April 30th, 1976

PROJECT TITLE

ENVIRONMENTAL CONTROL AND SAFETY ASPECTS OF FLARING

KEY WORDS

HYDROCARBON FLARES

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. T. A. Brzustowski
University of Waterloo

LIAISON OFFICER OR SUPERVISOR R. J. Lyons

RESEARCH CATEGORY:

INTERNAL

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

GRANT X

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE: 1. To measure the temperature and composition fields in laboratory-scale model flares in a wind-tunnel.
2. To develop useful finite-difference techniques for numerical modelling of flames on elevated flares.

DESCRIPTION:

1. Laboratory work on flame radiation is almost complete. Results on the fraction F of total heat release rate which is radiated were published last August. Laboratory tests on the effect of steam and gas composition are complete, but the data are still being analysed.
2. A theoretical model has been developed which explains the general interplay at cross-wind combustion and buoyancy.
3. Wind-tunnel tests to determine gross properties of model flare flames have verified the useful accuracy of the previous work in predicting the rise and curvature of the flame.
4. Detailed numerical modelling of turbulent diffusion flames in a cross-wind by finite-difference techniques is proceeding more slowly than expected because of the enormous machine capacity required.
5. Detailed measurements of the composition field in the bent-over diffusion flames in the wind tunnel have proved to be more difficult than expected because of equipment limitations.

DURATION OF
PROJECT
IN YEARS

4

OF WHICH
PRESENT
YEAR IS

4th

ESTIMATED
COMPLETION
DATE

May 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR

SPECIAL

JOINTLY

X

OTHER

WORK

MINISTRY

FUNDED

PROJECT

PROGRAM

FUNDING

METHOD OF
REPORTING
RESULTS

- 1) Technical papers are written and presented at conferences or published in scientific journals.
- 2) Written and verbal presentation at the annual Research Grants Programme seminar.
- 3) Additional reports supplied on demand.

SUPPORT REQUIREMENTS

FROM OTHER BRANCHES: NONE.

REMARKS: The project has been extended because of the difficulties outlined in items #4 and #5.

PARTICIPATION BY OTHER MINISTRIES:

NONE



BRANCH: Air Resources Branch

DATE: May 6th, 1976

PROJECT TITLE Continuation of an Experimental Investigation of Gas Atomised Spray Scrubbers.

KEY WORDS Scrubbers, Atomisation, Efficiency Design, Optimisation, Venturi

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. A.W. Gnyp, University of Windsor

LIAISON OFFICER OR SUPERVISOR E.T. Barrow

RESEARCH CATEGORY:

INTERNAL GRANT	X	UNSOLICITED CONTRACT		MULTI-YEAR PROJECT	X
		SOLICITED CONTRACT		CONCURRENT PROJECT	X

OBJECTIVE: To develop design parameters that would optimise the performance of gas atomised spray scrubbers.

DESCRIPTION:

Pressure drop data for the Pease-Anthony and the University of Windsor Venturi scrubbers will be acquired including measurements of liquid film flow rates and droplet distributions. This data will be used to validate pressure drop models developed at the University.

DURATION OF PROJECT IN YEARS	3	OF WHICH PRESENT YEAR IS	2	ESTIMATED COMPLETION DATE	Sept., 1978
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR PROGRAM X	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF REPORTING RESULTS A printed report will be submitted at year end, with a preliminary oral report at the Ministry Seminar.

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: None

REMARKS:

PARTICIPATION BY OTHER MINISTRIES: \$7,000 per year has been sought from MRC



BRANCH:

Air Resources

DATE:

May 7, 1976

PROJECT TITLE

Assessment of Yield Losses Due to Ozone and Botrytis in Onions

KEY WORDS

Ozone - Botrytis - Onion

PRINCIPLE INVESTIGATOR G. Hofstra

AND AFFILIATION Assistant Professor, Dept. of Environmental Biology, U of Guelph

LIAISON OFFICER

OR SUPERVISOR

Dr. S.N. Linzon & R.G. Pearson

RESEARCH CATEGORY:

INTERNAL

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

GRANT

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE:

- 1) To determine the amount of yield reduction that can be attributed to ozone or to Botrytis in Bradford and Thedford, Ontario
- 2) To determine the relative sensitivity of commercial onion cultivars
- 3) To develop dose-response relationships for ozone and onion injury

DESCRIPTION:

The research will be conducted in the Bradford and Thedford marshes. At each location, three cultivars will be treated with selected fungicides anti-oxidants and combinations of the two types of chemicals. Resistant and susceptible cultivars also will be planted in open-top air exclusion chambers and obscured for symptom development. The plot size will be greatly increased to obtain more meaningful estimates of yield reductions.

DURATION OF
PROJECT
IN YEARS

3

OF WHICH
PRESENT
YEAR IS

3rd

ESTIMATED
COMPLETION
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
FUND -
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED
PROJECT

OTHER

METHOD OF
REPORTING
RESULTS

Annual seminar and written reports

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:



BRANCH:

Air Resources

DATE:

May 7, 1976

PROJECT TITLE Study of Polynuclear Aromatic Hydrocarbons in Integrated
Samples of Particulate and Organic Vapors from Ambient Air at Selected Ontario
Sites

KEY WORDS

Polynuclear aromatic hydrocarbons, organic vapours, organic carcinogens

PRINCIPLE INVESTIGATOR

Prof. F.W. Karasek

nogens

AND AFFILIATION

Dept. of Chemistry, Univ. of Waterloo

LIAISON OFFICER

OR SUPERVISOR

Dr. R.B. Caton

RESEARCH CATEGORY:

INTERNAL

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

GRANT

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE:

To sample and analyse for PAH's in particulate and vapour phases in the atmosphere near anticipated emission sources and to evaluate the vapor/particulate fractionation of PAH from various sources, to field test an atmospheric vapour sampling train.

DESCRIPTION:

High-volume samples of airborne particulate matter and low-volume samples of airborne particulate matter and organic vapours collected by a new sampling train will be analysed for PAH by GC-MS techniques.

Samples will be collected at sites near suspected major sources of PAH emissions.

Emphasis will be placed on developing analytical techniques for the low-volume vapour samples.

DURATION OF
PROJECT
IN YEARS

1

OF WHICH
PRESENT
YEAR IS

1

ESTIMATED
COMPLETION
DATE 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
WORK
PROGRAM

X

SPECIAL
MINISTRY
FUNDING

—

JOINTLY
FUNDED
PROJECT

—

OTHER

—

METHOD OF
REPORTING
RESULTS

Annual report to Branch, due 1.4.77

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

Analysis of some samples by Laboratory Services Branch.

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:



BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE
Development of a Novel Particle Collector

KEY WORDS

PRINCIPLE INVESTIGATOR AND AFFILIATION
Prof. O. Trass, Dept. of Chemical Engineering & Applied Chemistry, Univ. of Toronto

LIAISON OFFICER OR SUPERVISOR
Mr. E.T. Barrow

RESEARCH CATEGORY:

INTERNAL GRANT	X	UNSOLICITED CONTRACT SOLICITED CONTRACT	MULTI-YEAR PROJECT CONCURRENT PROJECT
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OBJECTIVE: To test the performance of a novel particle collector for particles in the size range 1-20 microns, to compare it with the performance of other collection equipment useful in comparable size ranges, to study the operating and design variables of the collector, and to make suitable improvements, i.e., to develop it further.

DESCRIPTION: The principles of operation involve the utilization of centrifugal forces obtained from a variable rotational motion, combined with forces arising from acceleration and deceleration as well as deflection of the gas inside the unit.

The unit shown schematically in the figure has been machined from heavy aluminum plate, has a diameter of about 10 inches and is 4 inches thick (length of dimension). The surface profiles of the internal surfaces are of paramount importance. These are basically two compartments. The dust-laden gas enters the first one centrally and goes through a set of vanes which will impart some rotational motion. It then spreads out radially, while rotating, and also moves slightly forward (in axial direction). The axial dimension of this first compartment can be changed by re-positioning a central deflector which also separates the two compartments. At the outer periphery the gas turns back inward into the second compartment behind the deflector. The bulk of the dust will continue into a doughnut-shaped solids collection ring at the extreme outer periphery from where it can be withdrawn through one or two exit ports.

(overleaf)

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1	ESTIMATED COMPLETION DATE
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF REPORTING RESULTS
Report due 1.4.77

SUPPORT REQUIREMENTS FROM OTHER BRANCHES:
Nil

REMARKS:
Nil

PARTICIPATION BY OTHER MINISTRIES:

Description continued

The particles will be pushed out by their remaining angular momentum through the ports which can be adjusted to skim only the outer segment of the solids collection ring or over a sizeable fraction of its cross-section. The gas with the remaining dust, having entered the second compartment, moves back toward the center where it leaves the first unit. In intended normal operation, it will immediately enter the second unit through another set of vanes which give it added rotational motion.

The operation is repeated through as many stages as will be required to trap a sufficient fraction of dust. In laboratory operation, a fan at the end of the last stage (which initially will be the one and only stage) will provide the required suction.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE Support of General Research Activities

KEY WORDS Sulphur

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J.B. Hyne
Alberta Sulphur Research Institute

LIAISON OFFICER OR SUPERVISOR Dr. Frank Frantisak

RESEARCH CATEGORY:

INTERNAL GRANT X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE: To support general research activities of the Institute.

DESCRIPTION:

DURATION OF PROJECT IN YEARS	3	OF WHICH PRESENT YEAR IS	3	ESTIMATED COMPLETION DATE
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF REPORTING RESULTS Reports submitted on a continuous basis.

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: Nil

REMARKS: Nil

PARTICIPATION BY OTHER MINISTRIES:



BRANCH: Air Resources Branch

DATE: May 7, 1976

PROJECT TITLE Atmospheric Reactions of Polynuclear Aromatic Hydrocarbons
Seasonal Distribution in Relation to Influence of Major Emission Sources

KEY WORDS carcinogens
Polynuclear aromatic hydrocarbons, size fractionation, organic

PRINCIPLE INVESTIGATOR Prof. M. Katz, Centre for Research of Envl. Quality
AND AFFILIATION York University

LIAISON OFFICER
OR SUPERVISOR Dr. R.B. Caton

RESEARCH CATEGORY:

INTERNAL

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

GRANT X

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE: To analyse and identify various polynuclear aromatic hydrocarbons and their oxidation or decomposition products in airborne particulate matter at a number of locations in Ontario and to provide information on the seasonal distribution of PAH and variations in concentration attributable to the influence of major emission sources.

DESCRIPTION: Size-fractionated samples of airborne particulate matter collected by high-volume sampler fitted with Andersen cascade impactors will be analysed for about 15 PAH species. Filters will be exposed near major industrial complexes and other suspected sources of PAH emissions. PAH's characteristic of atmospheric oxidation will be analysed to elucidate degradation mechanisms. Samples will be collected during all seasons of the year to assist in identifying sources of atmospheric PAH.

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1	ESTIMATED COMPLETION DATE	1977
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR	X	SPECIAL	JOINTLY	
	WORK		MINISTRY	FUNDED	OTHER
	PROGRAM		FUNDING	PROJECT	

METHOD OF REPORTING RESULTS Annual report to Branch due 1.4.77

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: None

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE Trace Analysis of Compounds on Airborne Particulate Matter and Other Environmental Contaminants

KEY WORDS Organic trace contaminants, particulate matter, organic carcinogens

PRINCIPLE INVESTIGATOR AND AFFILIATION Prof. F.W. Karasek
Dept. of Chemistry, University of Waterloo

LIAISON OFFICER OR SUPERVISOR Dr. R.B. Caton

RESEARCH CATEGORY:

INTERNAL GRANT X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE:

To identify the major organic constituents of the atmosphere-vapour and particulate in various regions of the Province.

DESCRIPTION: Samples of particulate and vapour-phase matter collected from the atmosphere by high-volume samplers, low-volume samplers, and vapour adsorption cartridges will be qualitatively and quantitatively analysed for organic content by means of sophisticated gas chromatographic and mass spectrometric techniques. Emphasis will be placed on identification of individual chemical compounds present in these samples and on development of high-resolution capillary GC columns to improve the analytical resolution of these compounds from one another.

DURATION OF PROJECT IN YEARS	OF WHICH PRESENT YEAR IS	ESTIMATED COMPLETION DATE
3	1	1979

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM X	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF REPORTING RESULTS Annual report to Branch

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: Confirmation of selected results by Laboratory Services Branch.

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE Development of Intense, Tunable UV Gas Lasers for Remote Sensing in Air Pollution Studies

KEY WORDS Remote Sensing, Tunable UV Laser, Fluorescence Lidar

PRINCIPLE INVESTIGATOR AND AFFILIATION Prof. G.A. Kenney-Wallace, Dept. of Chemistry University of Toronto

LIAISON OFFICER OR SUPERVISOR Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL
GRANT

X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE:

To develop intense, pulsed, tunable ultraviolet lasers which could be used for the remote detection of gaseous pollutants by fluorescence techniques.

DESCRIPTION:

- 1) Tunable laser operation in KrF (248 nm) and XeF (350 nm) is to be achieved in a Blumlein transverse discharge device. These lasers are expected to have several kW output power and tunability range of 5 nm.
- 2) The applicability of these lasers to remote sensing of gaseous pollutants will be studied in the lab. This will primarily be a spectroscopic study of the absorption and fluorescence characteristics of several gaseous pollutants. Relevant design parameters will be determined.

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1st	ESTIMATED COMPLETION DATE	3.31.77
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BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

METHOD OF REPORTING RESULTS Formal report due March 1977

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: Nil

REMARKS:

PARTICIPATION BY OTHER MINISTRIES: Nil



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

May 7, 1976

PROJECT TITLE

The Calibration of a Mass Spectrometer System Designed
to Measure SO₂ and SO₃ in Wet Air

KEY WORDS

H₂SO₄, mass spectrometric

PRINCIPLE INVESTIGATOR

Prof. P.L. Silveston

AND AFFILIATION

Dept. of Chemical Engineering, Univ. of Waterloo

LIAISON OFFICER

OR SUPERVISOR

Mr. D. Mozzon

RESEARCH CATEGORY:

INTERNAL

GRANT

x

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

The overall objective of the project as described in our original proposal, is to develop an on-line SO₃ detection system at reasonable cost. The objectives of the work described here are:

1. to calibrate the mass spectrometer against a standard EPA method
2. to construct a calibration curve for the range 10-1000 ppm (as SO₃).

See overleaf for more...

DESCRIPTION:

This is an extension of work commenced last year entitled "Demonstration of Mass Spectrometry for the Determination of Sulphur Trioxide (Sulphuric Acid) in the Presence of SO₂ with Application to Stack Sampling". This work represents the next step in the development of a mass spectrometric source monitor for sulphuric acid.

DURATION OF
PROJECT
IN YEARS

1

OF WHICH
PRESENT
YEAR IS

1

ESTIMATED
COMPLETION
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR

FORK

x

PROGRAM

SPECIAL

MINISTRY

FUNDING

JOINTLY

FUNDED

PROJECT

OTHER

METHOD OF
REPORTING
RESULTS

Report to be submitted by 1.4.77

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:

Objective continued:

3. to use, for the purposes of calibration, a "synthetic stack gas" which has a high moisture content and a high SO_2/SO_3 ratio.



BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE

Ion Induced Gas to Particle Reactions

KEY WORDS

SO₂, NH₃, ion enhanced reactions

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Prof. J.V. Iribarne
Dept. of Physics, University of Toronto

LIAISON OFFICER
OR SUPERVISOR

Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL
GRANT

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE: To study the effect of ions on the rates of selected atmospheric reactions.

DESCRIPTION:

It is proposed to study the reaction between sulfur dioxide and ammonia, with the aim of assessing the possible practical application of ion-catalysis to the removal of sulfur dioxide from gaseous mixtures. This would include:

- influence of the concentrations of sulfur dioxide, ammonia and water vapour.
- influence of the concentrations of ions, both in unipolar and bipolar atmospheres.
- assessment of the potential application for the removal of sulfur dioxide.

DURATION OF
PROJECT
IN YEARS

1

OF WHICH
PRESENT
YEAR IS

1

ESTIMATED
COMPLETION
DATE 31.3.77

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
WORK ~~X~~
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED
PROJECT

OTHER

METHOD OF
REPORTING
RESULTS

Report due 1.4.77

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

Nil

REMARKS:

Nil

PARTICIPATION BY OTHER MINISTRIES:

Nil



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE Atmospheric Sink Mechanisms for Airborne Particulates from
a Metal Processing Industry: A Preliminary Lidar Study

KEY WORDS Sinks, Lidar, lake breeze

PRINCIPLE INVESTIGATOR Dr. D.R. Hay,
AND AFFILIATION Dept. of Physics, The Univ. of Western Ontario

LIAISON OFFICER
OR SUPERVISOR Mr. L. Shenfeld

RESEARCH CATEGORY:

INTERNAL
GRANT X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE: To examine the potential of the ruby lidar in defining the
natural sink mechanisms for hazardous particulates injected into an urban
environment.

DESCRIPTION: An initial study of the atmosphere about a selected metal pro-
cessing industry as a sink of its particulate effluent. The ruby lidar, that has
been developed and operated as an atmospheric probe for several years by the wri-
ter's laboratory, will provide the method for observing the particulate dispersal.
The site for these observations will be in the Hamilton area near the urban-lake
boundary, where a full view of the stack plume is available. Studies of the spe-
cial atmospheric circulation in this region have been reported elsewhere (Weisman
et al 1969; Oke et al 1970; Rouse et al 1973). Of interest here are the land-
lake breeze circulation that stores particulate in the air over the water during
part of the day and returns it to Hamilton at other times, the development of
temperature inversions that trap the particulates at low levels over the city,
and the katabatic drainage of polluted air into re-entrant valleys. The present
study will examine the plume trajectory and dispersal over the lake and over Ha-
milton, the ambient levels of particulate concentration at the ground, and the
change in concentration level with height above ground - as governed by the natu-
ral conditions under which the surface exposure will be minimal.

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1	ESTIMATED COMPLETION DATE	31.3.77
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF
REPORTING
RESULTS Report due 1.4.77

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES: Nil

REMARKS: Nil

PARTICIPATION BY OTHER MINISTRIES: Nil



BRANCH:

Air Resources

DATE:

May 7, 1976

PROJECT TITLE High Resolution Spectroscopic Studies on Daylight and Atmospheric Absorption over the Toronto Region, with Specific Application to the elucidation of the "brown atmospheric haze".

KEY WORDS Haze, spectroscopic, NO₂, aerosols

PRINCIPLE INVESTIGATOR Prof. R.W. Nicholls.

AND AFFILIATION Professor of Physics, York University

LIAISON OFFICER

OR SUPERVISOR

Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL

GRANT

x

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

Determination of the causes of coloured hazes over the Toronto area using high resolution spectroscopic techniques.

DESCRIPTION:

To firmly establish the daylight spectrum over Toronto to identify absorption features and their strengths with the objective of determining the cause of the coloured haze. Computer simulations of atmospheric absorption spectra will be used as required.

DURATION OF
PROJECT
IN YEARS

2

OF WHICH
PRESENT
YEAR IS

2

ESTIMATED
COMPLETION
DATE 31.3.77

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
WORK
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED
PROJECT

OTHER

METHOD OF
REPORTING
RESULTS

-

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

Nil

REMARKS:

Nil

PARTICIPATION BY OTHER MINISTRIES:

Nil



BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE Point Monitoring of Gaseous Pollutants Such As SO_2 , O_3 , NO_x , H_2S by Resonance Infrared Absorption Using Tunable Diode Lasers

KEY WORDS

Gaseous Pollutant, Point Monitor, Diode Laser, IR Absorption

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Prof. J. Shewchun, Dept. of Engineering Physics
McMaster University

LIAISON OFFICER
OR SUPERVISOR

Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL

GRANT X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

To develop an economic point monitoring system for various gaseous pollutants based on the resonance infrared absorption technique using tunable diode lasers as radiation sources.

DESCRIPTION:

- 1) Infrared absorption measurements on several gases (O_3 , NO_x , H_2S , SO_2) are to be carried out to determine relevant design parameters.
- 2) A prototype point monitoring system is to be constructed. The system will use an operational Pb Sn Se diode laser (3-20u) as radiation source. The researcher will concentrate on SO_2 as the prototype pollutant.
- 3) The prototype system will be tested in the lab and in the field.
- 4) GaInAs diode lasers, operating in 1-3u range, will be developed for use in the prototype system.

DURATION OF
PROJECT
IN YEARS

1

OF WHICH
PRESENT
YEAR IS

1

ESTIMATED
COMPLETION
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
WORK
PROGRAM

1

SPECIAL
MINISTRY
FUNDING

—

JOINTLY
FUNDED
PROJECT

—

OTHER

—

METHOD OF
REPORTING
RESULTS

Formal report due March 31, 1977

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

An SO_2 monitor (Beckman 906 or equivalent) to be provided by ARB or W-C Region for comparison testing of prototype system

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:

None



BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE Multiple Applications of the Trace Atmospheric Gas
Analyser (TAGA) System to Air Quality Measurements

KEY WORDS Trace, Air Analysis, TAGA, Analyzer

PRINCIPLE INVESTIGATOR Prof. J.B. French

AND AFFILIATION Institute for Aerospace Studies, University of Toronto

LIAISON OFFICER
OR SUPERVISOR Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL
GRANT X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE: To apply a novel instrument developed at UTIAS to the measurement of trace atmospheric components with particular reference to hazardous materials.

DESCRIPTION:

Using the "Trace Atmospheric Gas Analyzer" (TAGA) developed at the UTIAS, real time monitoring of selected hazardous materials, such as PAH's, PCB's nitrosamines, will be attempted.

DURATION OF PROJECT IN YEARS	2	OF WHICH PRESENT YEAR IS	2	ESTIMATED COMPLETION DATE
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	SOURCES OF FUNDS:			
	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF
REPORTING
RESULTS Report due 1.4.77

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES: Nil

REMARKS: Nil

PARTICIPATION BY OTHER MINISTRIES:
Nil



BRANCH: Air Resources

DATE: May 7, 1976

PROJECT TITLE

Particulate Pollution in the Nanticoke Region

KEY WORDS

Particulate, Aerosol, Source, Nanticoke

PRINCIPLE INVESTIGATOR

Dr. L.D. Pengelly

AND AFFILIATION

Asso. Prof. Dept. of Medicine, McMaster University

LIAISON OFFICER

OR SUPERVISOR

Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL

GRANT X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

- To (a) determine the suspended particulate loading in the Niagara Peninsula
(b) characterise the aerosol particulate matter
(c) attempt to linking of composition to sources.

DESCRIPTION:

Samples of suspended particulate matter will be collected at selected locations in the W.C. Region. Samples will be both total and size fractionated type. The collected samples will be analyzed by the Laboratory Service Branch.

DURATION OF
PROJECT
IN YEARS

2

OF WHICH
PRESENT
YEAR IS

2

ESTIMATED
COMPLETION
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

METHOD OF
REPORTING
RESULTS

Report due 1.4.77

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

Analysis of SPM by LSB.

REMARKS:

Nil

PARTICIPATION BY OTHER MINISTRIES:

Nil



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: May 10, 1976

PROJECT TITLE

Grape Responses to Oxidant Smog in Southwestern Ontario

KEY WORDS

Ozone, Grapes

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Dr. D.P. Ormrod, University of Guelph

LIAISON OFFICER

OR SUPERVISOR

Dr. S.N. Linzon and D.S. Harper

RESEARCH CATEGORY:

INTERNAL

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

GRANT

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE:

- to conduct an intensive survey of smog (O_3) damage to grapes in SW Ontario throughout 1976 growing season
- to determine the relative sensitivities of grape cultivars to O_3 under field conditions in SW Ontario
- to evaluate the efficacy of certain chemical protectants in the protection of grape foliage from O_3 damage in SW Ontario

DESCRIPTION:

Growing season research would include at least one detailed inspection of commercial and experimental vineyards in Essex and Kent counties for ozone injury. Relative cultivar sensitivity will be determined wherever possible. Up to four vineyards will be studied intensively. Ozone damage will be related to day-to-day O_3 or oxidant concentrations recorded at Windsor or Harrow. Air monitoring will be supplemented with portable MAST meters at each of up to 4 vineyards.

Chemical protectant treatments would include foliar sprays and possibly soil drenches of promising chemicals. Protectants will include a fungicide, an anti-oxidant and of growth regulator. Emphasis will be placed on finding a protectant which has no deleterious effects on vine growth, and inexpensive, and have a long-lasting effects. Protection experiments will be carried out at the four intensively studied vineyards.

DURATION OF
PROJECT
IN YEARS

1

OF WHICH
PRESENT
YEAR IS

1

ESTIMATED
COMPLETION
DATE Nov. 1976

BUDGET:

TOTAL DOLLARS \$5,500

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF FUNDS:

REGULAR
WORK
PROGRAM

X

SPECIAL
MINISTRY
FUNDING

—

JOINTLY
FUNDED
PROJECT

—

OTHER

—

METHOD OF
REPORTING
RESULTS

Annual seminar and report

SUPPORT REQUIREMENTS
FROM OTHER BRANCHES:

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:

Cooperation of Ms. Helen Fisher, Extension Specialist, OMAF

1293 3/76 at Harrow to a maximum of 4 hours/week



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources Branch

DATE: June 25, 1976

PROJECT TITLE

Atmospheric Persistence of Polychlorinated Biphenyls

KEY WORDS Polychlorinated biphenyls; PCB; Atmospheric lifetime

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. A.J. Yarwood

LIAISON OFFICER
OR SUPERVISOR

Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL
GRANT XUNSOLICITED CONTRACT
SOLICITED CONTRACTMULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE:

1. To determine the chemical lifetime of polychlorinated biphenyls (commercial mixtures or pure isomers) with respect to photochemical degradation under simulated atmospheric conditions.
2. To determine the products and mechanisms of photochemical reactions of PCB's in vapour or aerosol form under simulated atmospheric conditions.

DESCRIPTION:

Decisions concerning the necessity for control and abatement of PCB atmospheric emissions and the means for achieving these ends should be based on knowledge both of emission source strengths and atmospheric dispersion and persistence. Data on source strengths are now becoming available, as a result of a recent programme undertaken by ORF for Environment Canada with the cooperation of MOE. Valid data on atmospheric chemistry of PCB's are now urgently needed in order to assess whether air pollution by PCB's is a serious problem.

Data on precipitation wash out of airborne PCB's are being collected by several agencies, including CCIW and MOE. It should be possible, as a result of that work, to estimate the effect of wet deposition on the atmospheric residence time of PCB's. The remaining essentially unknown factor is the effect of atmospheric degradation of PCB's by photochemically-produced reactive species or by direct photolysis by sunlight.

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1	ESTIMATED COMPLETION DATE	Sept. 77
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BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	X				

METHOD OF REPORTING RESULTS Seminar & interim Report March 77; Final report upon completion.

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: Nil

REMARKS: Nil

PARTICIPATION BY OTHER MINISTRIES: Nil



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July 7, 1976

PROJECT TITLE Laboratory and Field Evaluation of Commercially Available
Aerosol Analysis Instruments

KEY WORDS Aerosol, particulate, evaluation

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. W.J. Megaw

LIAISON OFFICER

OR SUPERVISOR Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL

GRANT X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

To carry out a laboratory and field evaluation of selected commercially available aerosol analyzers.

DESCRIPTION: It is proposed that these instruments should be tested and compared on a series of different aerosols, such as monodisperse polystyrene spheres, liquid droplets, sodium chloride particles of known size distribution and other artificial aerosols and that the experiments should then be transferred to the field, for example in and around the city of Hamilton where a wide variety of industrial aerosols arising both from the city and elsewhere will be encountered. An attempt would be made to characterize these aerosols while they were being used by sampling on membrane filter papers and carrying out subsequent electron microscopic analysis.

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1	ESTIMATED COMPLETION DATE
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
	X			

METHOD OF REPORTING RESULTS Seminar February 1977, final report on completion

SUPPORT REQUIREMENT FROM OTHER BRANCHES: Nil

REMARKS: Nil

PARTICIPATION BY OTHER MINISTRIES: Nil



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: August 6, 1976

PROJECT TITLE

Instrumental Methods for Organic and Inorganic Analysis of Particulate

KEY WORDS Matter from Ambient Air

Particulate matter, Aerosol analysis, ESCA, SIMS

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. F. Karasek

LIAISON OFFICER

OR SUPERVISOR Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL

GRANT X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE: (1) to explore the scope of analytical methods which can provide a detailed analysis of both the organic and inorganic fractions of particulate matter suspended in air, and (2) to obtain such analyses for a series of samples obtained at one selected site in Ontario.

DESCRIPTION:

During the past several years research done at Waterloo has resulted in development of useable methods for extraction and analysis of complex organic mixtures adsorbed on airborne particulate matter. These methods involve the use of gas chromatography with high resolution columns and detection systems such as FID, ECD and mass spectrometry to give qualitative and quantitative information of the major components. These methods will be used in their present form for the organic fraction analyses.

Once the organic compounds have been removed, the remaining inorganic fraction of the particulate matter can be subjected to further analytical procedures. The analytical objective is to obtain elemental abundance and speciation for the compounds comprising the inorganic fraction of the suspended particulate matter. The number of elements and compounds observable will depend upon the relative abundances present. However, the following list indicates those of interest: Fe, Cu, Ni, Pb, Ca, As, Mg, Se, Cr, Zn, Cd, Mn, Be, V, Ag, S, Sc and Hg.

(see overleaf for continuation)

DURATION OF PROJECT IN YEARS	1	OF WHICH PRESENT YEAR IS	1	ESTIMATED COMPLETION DATE	Apr. 1/77
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF REPORTING RESULTS Seminar Feb. '77; Final report upon completion

SUPPORT EQUIPMENTS FROM OTHER BRANCHES: Nil

REMARKS: Nil

PARTICIPATION BY OTHER MINISTRIES:

Nil

Description continued..

The primary objective of this proposal is to explore instrumental methods capable of providing a rapid qualitative and quantitative analysis for these elements. This exploratory work will begin using the newer surface analysis instrumentation and techniques; such as ion-scattering spectrometry (ISS), electron spectroscopy for chemical analysis (ESCA), secondary ion mass spectrometry (SIMS). The applicant has done some exploratory work with all these methods on the inorganic particulates obtained from samples used for other ARB grants research with some promise of success (1,2,3). The methods of neutron activation analysis (INAA) and x-ray fluorescence analysis (XRF) will be used to complete the techniques explored.



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: December 8, 1976

PROJECT TITLE Research on the Feasibility of the Use of Low Cost Adsorption
Collection Devices as Air Pollution Monitors

KEY WORDS Adsorption; monitor; vapour phase pollutants

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. J.B. French, University of Toronto

LIAISON OFFICER

OR SUPERVISOR Dr. S. Stevens

RESEARCH CATEGORY:

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

To determine if low cost sorption-diffusion samplers are a
feasible method of measuring time averaged concentrations of
various vapour phase pollutants.

DESCRIPTION:

See attached work statement.

DURATION OF PROJECT IN YEARS	OF WHICH PRESENT YEAR IS	ESTIMATED COMPLETION DATE
1	1st	March '78

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR PROGRAM X	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

METHOD OF
REPORTING
RESULTS Seminar and Report.

SUPPORT REQUIREMENTS FROM OTHER BRANCHES: "Experience '77" or similar student support for
ambient air survey.

REMARKS:

PARTICIPATION BY OTHER MINISTRIES:

Description:

Work Statement

Analysis of Commercially Available Sampling Devices

An analysis will be made of the basic principles of operation of currently commercially available passive sampling devices used for the monitoring of volatile trace contaminants in air. These devices use low cost collection media which can be either chemically active or inactive and include a calibratable limiting resistance to the mass transfer of air contaminants into the collection medium. This limiting resistance can be a semi-permeable membrane (Minimonitor - Reiszner Environmental Labs) or a stagnant air layer contained in a defined diffusion geometry (Gasbadge-Walden Division of ABCOR).

The objective of this program is to study the feasibility of using such devices or better analogues of these devices for the analysis of a wide range of trace contaminants in the more complex, lower concentration, multiple pollutant outdoor air monitoring situation rather than in occupational environments where interest is usually centered on one or two pollutants. The program will be restricted to the study of extended surface solid adsorbent collection media such as activated charcoal, porous, polymers, etc. This preliminary analysis will cover the transport phenomena involved, the method of introducing a limiting resistance, and the analytical methodology used. This analysis will likely then be extended to consideration of the performance of these devices for the new task envisaged - the analysis of ambient air in the sub ppm level for a series of compounds which will be defined by mutual agreement between the Ministry of Environment personnel and the principal investigators. The effect of humidity and temperature on calibration will be considered. Minor improvements or modifications may be suggested at this stage.

Procurement of the Best Sampling System

Once the above analysis has been completed a design of an overall sampling system, based on these principles, optimized for the chosen series of compounds and their expected level in ambient air in the potential demonstration area will be carried out. An analytical methodology based on gas chromatography using flame ionization detection will also be installed or made available to complement this design. Emphasis will be placed on low cost, reproducibility and accuracy. A number of such sampling devices will then be procured for future evaluations.

Laboratory Calibration and Evaluation

The performance of these devices and the analytical methodology will be evaluated in the laboratory by exposing them to known concentrations of the selected compounds in air for known periods of time. The amount of traces adsorbed in

the collection medium will then be quantitatively analysed and the calculated concentrations derived from these results will be compared to the known concentrations. Since these calculated concentrations are obtained either through the use of a permeability coefficient in the case of a membrane or the product of a diffusion coefficient times a geometrical factor in the case of a diffusion device, this comparison in effect evaluates these numbers as functions of the trace compound and temperature, and the values so determined may be compared to available literature values. The effects of varying temperature, humidity and concentration will be studied in a preliminary manner as well as any interferences that may exist. Concentration time, (i.e. exposure) response curves will be determined for the compounds defined.

Field Trial

The previous tasks constitute the preparative stages for a meaningful field demonstration, and are to be completed by May 31, 1977.

In June-August 77, it is proposed, working with the collaboration of local M.O.E. personnel to conduct a series of tests in which a number of these collectors will be distributed in a selected area (Sarnia is suggested) for periods of time from one day to one month. Each will then be analysed for its exposure to the expected pollutants, the overall objective being to demonstrate the practicality of this approach, the general reliability, the suitability for the specific pollutants chosen, the sensitivity at this relatively early stage of development, and the areas requiring further research.

The costs of the direct manpower for these field trials, including the preparation of the multiple collectors, their field distribution collection and routine gas chromatographic analysis, field living costs and travel expenses are not covered in this proposal, but rather are included in a separate "Experience 77" proposal. The costs outlined in the next section cover the supervision and necessary training of these summer students, the overall management of the field trials, and the analysis and report of the raw data.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Laboratory Services

DATE:

Aug 15/75

PROJECT TITLE: BaP and BkF in Urban Atmospheres in Ontario - Part 3 (Results of a five year survey)

KEY WORDS: BaP, PAH, BkF, Fluoremetry, Survey, Hi-Vol Filter, Ontario

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. E. G. Adamek

LIAISON OFFICER
OR SUPERVISOR

Dr. O. Meresz

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT X
CONCURRENT PROJECT —

OBJECTIVE: To continue the survey of BaP and BkF in the air of eleven selected urban communities in Ontario for a five year period in order to obtain sufficient data for a more meaningful assessment of seasonal influences and other environmental factors upon the PAH levels in the atmosphere.

DESCRIPTION: The results of the first year survey (Part 1) and two year survey (Part 2) under Project EGA 7401 provided important and much needed new information which is already the basis for a number of new Ministry investigations. It is anticipated that the five year survey will supplement and extend this information in addition to providing a comparison of the pollution levels over an extended period of time.

To apply essentially the same methodology as used in Project EGA 7401 during part 1 and part 2 of the survey. To subject the results of the five year survey to statistical evaluations and to correlations with environmental influence in order to more clearly define those urban areas where pollution problems exist.

DURATION
OF PROJECT

2

YEARS

PRESENT
YEAR IS

1976/77

YEAR

REPORTING
DATE

March 78

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

Regular

SOURCE OF
FUNDS:

REGULAR X
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Bimonthly progress reports. Summary report at the end of the project.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Laboratory Services Branch

DATE:

PROJECT TITLE: Identification of organics in industrial effluents discharged into the St. Clair River

KEY WORDS: Water, trace organics, industrial effluents

PRINCIPLE INVESTIGATOR
AND AFFILIATION

W. K. Duholke

LIAISON OFFICER
OR SUPERVISOR

O. Meresz

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

Identification of organic compounds being discharged into the St. Clair River by the various industries located along its banks, as part of a major St. Clair River Monitoring Program.

DESCRIPTION:

Existing monitoring data (conventional parameters) do not indicate any impairment of water quality in the St. Clair River so the need was seen for the use of special parameters. Only one industry monitors its effluent effectively, therefore, identification and quantitation of the organic compounds present in the various industrial effluent is very important for assessing the quality of waste-waters discharged into the river.

Samples from the industrial effluents are screened for significant organic pollutants by extraction, concentration, and then analyzed by gas chromatography. Identification is by GC/MS where organics above significant levels are indicated. GC/MS and gas chromatographic analysis is used to identify and quantitate hazardous organics.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

1976/77 YEAR

REPORTING
DATE

March 78

BUDGET:

TOTAL DOLLARS

MAN DAYS

TOTAL PROJECT CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Reporting Procedure: Bimonthly reports, summary report and progress reports

Restricted distribution of interim reports in order to avoid misinterpretation of incomplete data

MINISTRY OF THE ENVIRONMENT
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-3

BRANCH LABORATORY SERVICES, WATER QUALITY SECTION

DATE August 27, 1975

PROJECT TITLE DEPTH RELATED OXYGEN PATTERN

KEY WORDS DISSOLVED OXYGEN DEPTH, ANALYSES, CORRELATION

PRINCIPAL INVESTIGATOR
AND AFFILIATION C. Simpson

LIAISON OFFICER
OR SUPERVISOR S. Villard

RESEARCH CATEGORY	INTERNAL X GRANT	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To describe and interpret phenomena that has been observed as a result of the Recreational Lakes Program

DESCRIPTION

Chemical and biochemical data from routine and intensive surveys of recreational lakes has been accumulated and related to water quality, nutrient cycling and eutrophication.

The data accumulated as a result of the Recreational Lakes program revealed an unexpected dissolved oxygen - depth correlation. This phenomena will be checked against other sources of data.

STARTING
DATE July, 1975

COMPLETION
DATE May 3, 1976

BUDGET
CURRENT YEAR

MAN YEARS

SOURCE OF FUNDS	REGULAR WORK PROGRAM <u>X</u>	SPECIAL MINISTRY FUNDING <u> </u>	JOINTLY FUNDED PROJECT <u> </u>	OTHER <u> </u>
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REPORTING
PROCEDURE Internal, modified for publication

REMARKS Project completed

MINISTRY OF THE ENVIRONMENT
RESEARCH AND DEVELOPMENT INVENTORYBRANCH Laboratory Services, Water Quality Section DATE September 2, 1976PROJECT TITLE Modification of Filtered Ammonia Analyses
to mitigate sample colour and Turbidity effectsKEY WORDS Analyses, Ammonia, Sample Colour, TurbidityPRINCIPAL INVESTIGATOR
AND AFFILIATION J. CrowtherLIAISON OFFICER
OR SUPERVISOR S. VillardRESEARCH CATEGORY INTERNAL GRANT ☒ UNSOLICITED SOLICITED MULTI-YEAR CONCURRENTOBJECTIVE To develop a reference channel suitable for the current ammonia test.
To introduce nitroprusside as the catalyst.
To evaluate an automated distillation procedure.DESCRIPTION Naturally coloured river samples and spring run-off samples are unsuitable for ammonia analyses unless steps are taken to compensate for their colour and turbidity.
a) Nitroprusside is a more sensitive catalyst for the indophenol reaction; its use may permit partial dilution of the interfering colour and turbidity.
b) A reference channel may prove possible; this channel would include the sample and pH adjustment at least.
c) Automated distillation would eliminate the sample matrix.STARTING DATE September, 1976COMPLETION DATE March 28, 1977BUDGET
CURRENT YEAR

MAN YEARS

SOURCE OF FUNDS REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐REPORTING PROCEDURE InternalREMARKS Project completed

MINISTRY OF THE ENVIRONMENT
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-5

BRANCH Laboratory Services, Water Quality Section DATE September 2, 1975

PROJECT TITLE EVALUATION OF TECHNICON AUTOMATED KJELDAHL DIGESTOR

KEY WORDS Automated Total Kjeldahl Nitrogen Digestor

PRINCIPAL INVESTIGATOR
AND AFFILIATION Dr. Fred P. Dieken

LIAISON OFFICER
OR SUPERVISOR S. Villard

RESEARCH CATEGORY	INTERNAL GRANT	<u>X</u>	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To evaluate the Technicon Digestor for Total Kjeldahl Nitrogen Determination

DESCRIPTION Some laboratories report success in performing Total Kjeldahl Nitrogen analyses by automating the digestion procedure by using the Technicon Digestor. As this step is the rate determining factor in performing Kjeldahl Nitrogen analyses and the most costly in terms of manpower, automation of the digester process is highly desirable.

Using the automated digester, a Technicon channel will be utilized to analyze for Kjeldahl nitrogen. This system will be evaluated by comparing the recoveries with the present system (manual digestion). Both routine samples and pure chemicals will be analyzed

STARTING DATE	<u>October 15, 1975</u>	COMPLETION DATE
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BUDGET CURRENT YEAR	MAN YEARS
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SOURCE OF FUNDS	REGULAR WORK PROGRAM <u>X</u>	SPECIAL MINISTRY FUNDING <u> </u>	JOINTLY FUNDED PROJECT <u> </u>	OTHER <u> </u>
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REPORTING
PROCEDURE Interim report

REMARKS Still open



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Laboratory Services

DATE:

August 1977

PROJECT TITLE: Development of an interim Method for the Determination of
Asbestos Fibres in water by Transmission Electron Microscopy.

KEY WORDS: Asbestos, Chrysotile, Amphibole, Water Samples, Transmission
Electron diffraction.

PRINCIPLE INVESTIGATOR T.W. Pang, MOE, Members of the Ontario Ministry of the
AND AFFILIATION Environment, Committee on Asbestos Analysis, 1976/77. Dr. E
Chatfield, ORF, Dr. H. Cunningham, H & W.C. Dr. R. Durham C.C.I.W. Dr. J
LIAISON OFFICER Kramer, McMaster U. Dr. J. Mothersill, Lakehead U, Dr. J. Pimenta
OR SUPERVISOR M.O.E. Dr. R. Pontefract H & W.C. Dr. R. Lao (Env. Canada)

Supervisor - Mr. A.C. Rayner, Committee Chairman, M.O.E.
RESEARCH INTERNAL UNSOLICITED CONTRACT MULTI-YEAR PROJECT
CATEGORY: GRANT SOLICITED CONTRACT CONCURRENT PROJECT

OBJECTIVE: (1) To conduct inter-laboratory comparisons of selected methods
for the determination of asbestos fibres in water and based on the results
of this study to (2) develop a recommended interim method for the
determination of asbestos fibres in water by transmission electron micros-
copy, for use by Ontario analysts.

DESCRIPTION: Asbestos is a ubiquitous pollutant, known to be hazardous to
health. Because of lack of a single accepted and tested method of
analysis for asbestos, precise and comparable analytical data on the
levels of asbestos in Ontario waters are not available. In the projected
inter comparison studies, participating laboratories include Lakehead and
McMaster Universities, the Ontario Research Foundation, Environment
Canada, Health and Welfare Canada and the Ontario Ministry of the
Environment. Samples of water from selected sites in Ontario will be
analysed for asbestos content by all laboratories. Problems connected
with the enumeration and identification of asbestos fibres will be
investigated and a method recommended for adoption.

DURATION OF PROJECT	1.5 YEARS	PRESENT YEAR IS	1 st (1976-77)	REPORTING DATE	Sept /77
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes. Two reports will be issued in accordance with
the project objectives.

PARTICIPATION BY OTHER MINISTRIES:

See above.

REMARKS: Projected cost for 1977/78 = \$10,900 will include checking
precision of the recommended method and production of the final
reports.
Two laboratories (Health & Welfare Canada and the Canada
Centre for inland Waters) participated in the study at no
cost to the Ministry.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services

DATE: August 1977.

PROJECT TITLE: Development of an interim Method for the Determination of Asbestos Fibres in Air by Transmission Electron Microscopy.

KEY WORDS: Asbestos, Chrysotile, Ampibole, Air Filters, Transmission Electron microscope, Electron diffraction, low temperature ashing.

PRINCIPLE INVESTIGATOR T.W. Pang, MOE, in association with Dr. E. Chatfield, ORF, AND AFFILIATION Dr. H. Cunningham and R. Pontefract, H & W.C. Dr. J. Kramer, McMaster U. Dr. J. Mothersill, Lakehead U. Dr. R. Lao, Environment Canada, LIAISON OFFICER Dr. J. Pimenta. MOE.

OR SUPERVISOR A.C. Rayner, Chairman - Ontario Ministry of the Environment.

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: (1) To investigate sampling methods used to isolate asbestos fibres from ambient air. (2) To develop a recommended method for the determination of asbestos in ambient air by transmission electron microscopy for use by Ontario analysts.

DESCRIPTION: The adverse health effects of asbestos in air have been well documented. No agreement has been reached on the type of filter to be used to isolate the asbestos from air for analysis, nor has an analytical method been agreed upon for use by the various laboratories engaged in asbestos analysis. Testing of several different filter media, will be initiated and the filters will be analyzed by 5 Ontario Laboratories participating in the study, from samplers located at selected sites. Treatment of the exposed filters prior to electron microscopic examination and identification of fibres will be investigated, and a method recommended for adoption.

DURATION OF PROJECT	1.25 YEARS	PRESENT YEAR IS	1 st YEAR 1976-77	REPORTING DATE	Jan.31/78
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	76/77	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	X (36,000)	JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

SEE ABOVE

REMARKS: Projected cost for 1977-78 = \$10,500 includes precision testing of the recommended method and production of the final report. One laboratory (Health and Welfare Canada) participated in the study at no cost to the Ministry.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory

DATE:

PROJECT TITLE: The Decline in Mercury Concentrations in Fish from
- Lake St Clair , 1970 - 1976

KEY WORDS: mercury, decline, Lake St Clair, fish

PRINCIPLE INVESTIGATOR
AND AFFILIATION B.P. Neary, Air Quality Section

LIAISON OFFICER
OR SUPERVISOR J.N. Bishop, Manager , AQL

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To document the rate of decline in the mercury levels in fish from Lake St Clair and to estimate the time at which commercial fishing operations might be reopened.

DESCRIPTION: Yearly fish surveys have been taken from L. St Clair. There had been no attempt to summarize this mass of data or to establish trends.
Mercury vs length and mercury vs weight regressions were determined and fish of similar sizes were compared from year to year and the mercury content was found to decline exponentially.

DURATION OF PROJECT .75 YEARS PRESENT YEAR IS 1976 YEAR REPORTING DATE May 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR ☒ WORK ☐ PROGRAM SPECIAL MINISTRY ☐ FUNDING JOINTLY FUNDED ☐ PROJECT OTHER ☐

IS A REPORT ANTICIPATED? yes

PARTICIPATION BY OTHER MINISTRIES: no

REMARKS: Report published May 1977, government publication.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory

DATE:

PROJECT TITLE: Health Implications Of Contaminants in the Aquatic Environment

KEY WORDS: Contaminants, fish, mercury, PCB, Mirex

PRINCIPLE INVESTIGATOR AND AFFILIATION B.P. Neary

LIAISON OFFICER OR SUPERVISOR J.N. Bishop

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To prepare a comprehensive summary of contaminant levels in Ontario fish.

DESCRIPTION:

There had been no recent publication informing the public of contaminant levels in Ontario fish. The previous publication (1972) was outdated.

The contaminant data was statistically analysed to yield size-specific information as a more useful way to present the data to anglers with regard to mercury levels in sports fish.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>1976</u> YEAR	REPORTING DATE	<u>May 1977</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	yes				

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Labour to publish final document - Jul 1977

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services

DATE: Dec. 7/75

PROJECT TITLE: PCB Formation in Sewage Chlorination

KEY WORDS: PCB, Biphenyl, Chlorination, Sewage Treatment

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. O. W. Berg, MOE, Pesticides Section

LIAISON OFFICER OR SUPERVISOR Mr. G. A. V. Rees

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To investigate the potential for formation of lower chlorinated biphenyls (mono, di, tri chloro-) in sewage treatment plants through the chlorination of biphenyl originating from industrial discharges and other sources.

DESCRIPTION: The formation of chlorinated biphenyls by treatment of biphenyl with aqueous chlorinating agents has been demonstrated under clean laboratory conditions. This project will determine whether similar reactions occur under routine STP chlorination conditions.

- (1) Detailed GC-MS analysis of PCB composition will be undertaken on sewage samples before and after chlorination on 5 STPs receiving biphenyl in waste discharges.
- (2) Biphenyl will be metered into an STP stream immediately prior to chlorination. Detailed GC-MS analyses will detect changes in amounts of lower chlorinated biphenyls.
- (3) Analytical studies will be performed to determine whether biphenyl can survive initial treatment processes sufficiently to reach the chlorination stage.
- (4) Examine the effect of other organics on the chlorination of biphenyls.

DURATION OF PROJECT 8 MONTHS PRESENT YEAR IS 1977/78 YEAR REPORTING DATE Dec. 77

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Project will be carried out jointly with Mr. P. Foley, Research Coordinator, Pollution Control Branch. Immediate evaluation of this project is requested due to current legislative exposure of this issue



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services

DATE: Feb. 22/77

PROJECT TITLE: PCB Analysis in Ambient Air

KEY WORDS: PCB, Air, Florisil

PRINCIPLE INVESTIGATOR
AND AFFILIATION J. OsborneLIAISON OFFICER
OR SUPERVISOR G. A. V. ReesRESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———OBJECTIVE: To develop a simplified trapping system to monitor PCB levels in
ambient air.DESCRIPTION: Ambient air sampling for trace organics analysis has been performed using
liquid impingers, polymer adsorbents, and high volume filters. Impingers are cumbersome
and difficult to analyze. Filters do not trap vapors. Polymers adsorbents are expensive
and hard to clean. If an inorganic adsorbent such as florisil could be used, it would
be cheap, easy to clean and disposable. The experimental program includes the following:

Design sampling cartridge (glass) and prefilter.

Test Florisil in cartridge for: (1) Blank levels

(2) Florisil rates

(3) Efficiency of adsorption

(4) Efficiency of elution

(5) Effects of humidity, using an air sampling system,

carry out a sampling survey of ambient air levels of PCB prior to, during, and after
a "burn" of waste PCB's at St. Lawrence Cement, in conjunction with Dr. E. Singer,
Air Resources Branch.

DURATION OF PROJECT	<u>6</u> MONTHS	PRESENT YEAR IS	<u>1976/77</u> YEAR	REPORTING DATE	<u>Sept. 77</u>
BUDGET:	TOTAL DOLLARS		MAN DAYS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED —	OTHER —	

IS A REPORT ANTICIPATED? Bimonthly progress reports - summary report

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services Branch

DATE: August 1976

PROJECT TITLE: Asphalt as a Potential Source of PAH's in the Environment

KEY WORDS: Polynuclear aromatic hydrocarbons, asphalt, gas chromatography/mass spectrometry

PRINCIPLE INVESTIGATOR
AND AFFILIATION T. Sakuma

LIAISON OFFICER
OR SUPERVISOR W. Duholke

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To determine if asphalt is a potential source of polynuclear aromatic hydrocarbons (PAH's) in the environment.

DESCRIPTION: Certain PAH's are extremely potent carcinogens. These compounds are known to exist in virtually every facet of the environment. PAH levels associated with combustion engines, industrial emissions and urban use of fossil fuels for heating have been investigated. However, little attention has been paid to asphalts from paving and roofing as potential PAH sources.

A variety of paving and roofing asphalts were examined for PAH content. Aged asphalt samples were analyzed, and oxidation products of PAH's investigated.

DURATION OF PROJECT: 5 MONTHS PRESENT YEAR IS 1976/77 YEAR REPORTING DATE: August 76

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN DAYS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? Report has already been prepared

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Form of Report: Presentation (published abstract)
Internal Report



Ontario

BRANCH:

RESEARCH AND DEVELOPMENT INVENTORY

PAGE

PAC-1

DATE: April 27, 1977.

Pollution Control

PROJECT TITLE:

Blood cholinesterase levels of field workers and packers of Holland Marsh

KEY WORDS:

Cholinesterase levels, field workers, packers, Holland Marsh

PRINCIPLE INVESTIGATOR
AND AFFILIATION

J. R. BROWN, University of Toronto

LIAISON OFFICER
OR SUPERVISOR

PESTICIDES ADVISORY COMMITTEE

RESEARCH
CATEGORY:INTERNAL —
GRANT XUNSOLICITED CONTRACT —
SOLICITED CONTRACT —MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To determine blood cholinesterase levels of field workers and packers of Holland Marsh.

DESCRIPTION:

Since the discontinuance of DDT, organophosphate insecticides, principally parathion, have been used extensively in the Holland Marsh. The study is designed to determine the blood cholinesterase levels of field workers using organophosphates together with a control group of product packers.

DURATION
OF PROJECT1 YEARSPRESENT
YEAR IS

YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:REGULAR
WORK X
PROGRAMSPECIAL
MINISTRY —
FUNDINGJOINTLY
FUNDED —
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Report received

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77.



BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE: Simultaneous determination of intact benomyl and its degradation product (MBC) in plants in relation to their biological activities.

KEY WORDS: Benomyl, MBC

PRINCIPLE INVESTIGATOR AND AFFILIATION M. Chiba,
Brock University

LIAISON OFFICER OR SUPERVISOR PESTICIDES ADVISORY COMMITTEE

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To determine if benomyl can be applied at reduced rates without losing its biological activity.

DESCRIPTION:

To investigate the movement of oxamyl in plants by utilizing ¹⁴C-labeled oxamyl.

To identify parent and degradation compounds by gas chromatography (GC) and GC-Mass Spectrometry system (MS).

To investigate toxicities of parent and degradation compounds to nematodes and insects.

DURATION OF PROJECT 3 YEARS PRESENT YEAR IS 2 YEAR REPORTING DATE December 1976

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK ☒ PROGRAM SPECIAL MINISTRY ☐ FUNDING JOINTLY FUNDED ☐ PROJECT OTHER ☐

IS A REPORT ANTICIPATED?

Interim report for 2nd year received.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

The economic threshold of the cereal leaf beetle, Oulema melanopus (L) on oats and barley in southwestern Ontario

KEY WORDS:

Cereal Leaf Beetle, Oats, Barley

PRINCIPLE INVESTIGATOR
AND AFFILIATION

C. R. Ellis,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

PESTICIDES ADVISORY COMMITTEE

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To establish the economic threshold of the cereal leaf beetle, Oulema melanopus (L) on oats and barley in southwestern Ontario.

DESCRIPTION:

To determine economic thresholds for the cereal leaf beetle in Ontario on oats and barley, specifically:-

- 1) to obtain various populations of cereal leaf beetle on oats and barley by application of pesticide to infested fields and to obtain grain yield for these field plots.
- 2) to obtain yield data from caged oats and barley infested with various populations of cereal leaf beetle.
- 3) to determine how the stage of the crop, when attacked, affects the economic threshold.
- 4) to determine the time of parasite activity (Tetrastichus incertus) with respect to spray times.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Interim Report for 2nd year received.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77.



Ontario

BRANCH:

Pollution Control

DATE: April 27, 1977.

PROJECT TITLE:

Disease Control in Turf Grass

KEY WORDS:

disease control, turf grass

PRINCIPLE INVESTIGATOR
AND AFFILIATION

S. G. Fushtey,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

Disease control in turfgrass - an integrated approach to control of
Helminthosporium blights and Sclerotinia dollar spot

DESCRIPTION:

- To expand the knowledge of disease control methods in use by turf grass managers
- To determine effects of excessive use of fungicides
- To develop recommendations for management practices which would involve minimum use of fungicidal chemicals

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Interim report received

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Reduction of fungicide usage on vegetable crops by timing fungicide applications according to weather data

KEY WORDS:

Fungicide, weather data

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Gillespie, T. J. and Sutton, J. C. -

University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To schedule only necessary sprays as opposed to a regular preventative program.

DESCRIPTION:

- To field-test a fungicide spray-timing scheme based on rules similar to those tested in 1975, but less stringent with regard to dew period and temperature requirements.
- To field-test the scheme as in 1975 but on a larger number of farms of cooperating growers.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Interim report for 1976 received.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Natural control of soil borne plant pathogenic fungi

KEY WORDS: fungi

PRINCIPLE INVESTIGATOR
AND AFFILIATION

R. Hall,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the feasibility of natural control of soil-borne
plant-pathogenic fungi

DESCRIPTION:

To determine whether soils suppressive to bean rot occur in Ontario.
To transfer the suppressive property to soils conducive to bean
root rot.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Interim report received

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



Ontario

BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Electrostatic application of pesticides in orchards and field crops

KEY WORDS:

Electrostatic Application of Pesticides

PRINCIPLE INVESTIGATOR
AND AFFILIATION

I. I. Inculet

University of Western Ontario

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To test the feasibility of using minimum-waste electrostatic pesticide application technique for orchard and field crop foliage, and to develop a working applicator model, suitable for mounting on a tractor.

DESCRIPTION:

Develop a 5 nozzle sprayer and carry out a study of the drift and ground deposition for charged versus uncharged particles and assess the effectiveness when applied electrostatically.

DURATION
OF PROJECT

5 YEARS

PRESENT

YEAR IS

4 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Interim report for 1976 received

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH:

Pollution Control

DATE: April 27, 1977.

PROJECT TITLE:

Effects of sublethal concentrations of diazinon on stream invertebrates

KEY WORDS:

Diazinon, Stream Invertebrates

PRINCIPLE INVESTIGATOR
AND AFFILIATION

N. K. Kaushik,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To identify the effects of sublethal concentrations of diazinon
on stream invertebrates.

DESCRIPTION:

- a) To investigate effects of transient and prolonged exposure to sublethal doses of diazinon on the biology of invertebrates (movement, feeding, growth, reproduction, etc.).
- b) To investigate changes, if any, in the pattern of diversity of stream benthos exposed to prolonged and repetitive introduction of low levels of diazinon.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

3 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Interim Report for 1976 received.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77.



BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Development of a synthetic sex attractant for monitoring apple maggot

KEY WORDS:

Synthetic Sex Attractant, Apple Maggot

PRINCIPLE INVESTIGATOR
AND AFFILIATION

J. E. Laing, University of Guelph
C. C. Leznoff, York University

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To develop a synthetic sex attractant for monitoring apple maggot

DESCRIPTION:

1. To isolate and synthesize a sex attractant for the apple maggot, Rhagoletis pomonella Walsh.
2. To run laboratory and field assays on the efficiency of candidate sex attractants in comparison to the bait and sticky board traps presently in use for R. Pomonella.

The synthesis of candidate chemicals will be carried out at York University, while the laboratory and field assays will be carried out at the University of Guelph.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Interim report for 1976 received.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Development of an effective monitoring technique and an alternative non-chemical method of control for the onion maggot

KEY WORDS:

Non-chemical control, Onion maggot

PRINCIPLE INVESTIGATOR
AND AFFILIATION

F. L. McEwen,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To evaluate the biological and physical parameters that determine the successful use of the sterile male technique to control the onion maggot.

DESCRIPTION:

The onion maggot is a major pest of onions throughout the world. In most onion-growing areas of Canada, there are three generations per year and control procedures consist of an application of insecticide in the seed furrow at planting, plus foliage applications throughout the season. Organophosphate insecticides are used. Failure to control the onion maggot results in almost complete crop loss.

DURATION
OF PROJECT

5 YEARS

PRESENT
YEAR IS

4 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Progress report received for 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



Ontario

BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Population studies and damage assessment of an aphodiine dung beetle,
Ataenius spretulus Harold (Coleoptera: Scarabaeidae) on turf grasses

KEY WORDS:

Aphodiine dung beetle, Turfgrass

PRINCIPLE INVESTIGATOR
AND AFFILIATION

M. K. Sears,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To assess the damage caused to turfgrass by an aphodiine dung beetle

DESCRIPTION:

- 1) To determine the extent and nature of damage by this beetle to different turfgrass management practices in Ontario.
- 2) To examine the life history of this beetle, especially overwintering habits, number of generations, and period of larval development.
- 3) To develop adequate means of sampling and evaluating populations of these beetles in both the adult and larval stages.
- 4) To evaluate natural mortality agents under Ontario conditions, especially the bacterial disease affecting these insects.
- 5) To assess the activity of certain granular formulated insecticides on the larvae of this beetle and on other arthropods occurring in turfgrass.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT CURRENT YEAR

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Persistence and mobility of residues of organophosphorus insecticides used for vegetable production on organic soils in southwestern Ontario

KEY WORDS:

Residues, Organophosphorus Insecticides, Organic Soils

PRINCIPLE INVESTIGATOR
AND AFFILIATION

E. Y. Spencer, J. R. W. Miles, and R. A. Chapman,
University of Western Ontario

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To study persistence and mobility of residues of organophosphorus insecticides used for vegetable production on organic soils in southwestern Ontario

DESCRIPTION:

- 1) To survey the extent to which insecticide residues, particularly organophosphorus insecticides are present in organic soils throughout southwestern Ontario (Bradford, Keswick, Thedford, Erican and Leamington marshes).
- 2) To study, in microplots, the persistence and degradation of organophosphorus insecticides in organic as compared to mineral soils.
- 3) To study, in the laboratory, the behaviour, persistence and degradation of organophosphorus insecticides in water.
- 4) To initiate a preliminary study on the occurrence of insecticide residues in air in light and heavy pesticide use areas.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT CURRENT YEAR

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Report received December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77.



BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Methods to reduce herbicidal drift in roadside spraying

KEY WORDS:

Herbicide Drift

PRINCIPLE INVESTIGATOR
AND AFFILIATION

G. R. Stephenson,
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To evaluate methods to reduce herbicidal drift in roadside spraying

DESCRIPTION:

- 1) Conduct an exact repeat of the 1975 study to document the repeatability of this technique. A water control would be compared with Nalco-Trol/Lo-Drift and Bivert TDN.
- 2) In a separate study evaluate two new drift control materials.
- 3) Attempt to assess the actual spray deposit at one foot intervals on the ground within the target area. If these materials do in fact reduce drift, they should increase the spray deposit in the target area. If it can be shown that such an increase is significant, it may be possible to reduce herbicide application rates without reducing effectiveness in sprays where drift is controlled.

DURATION
OF PROJECT

3 YEARS PRESENT
YEAR IS 3rd YEAR

REPORTING
DATE December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Report received December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

The responses of bacteria, algae and invertebrates in small ponds to applications of mosquito larvicides

KEY WORDS:

Bacteria, Algae, Invertebrates, Small ponds, mosquito larvicides

PRINCIPLE INVESTIGATOR
AND AFFILIATION

M. G. Boyer and C. D. Fowle,
York University

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To investigate the responses of bacteria, algae and invertebrates in small ponds to applications of mosquito larvicides

DESCRIPTION:

- 1) Determine if the algal blooms are related to pesticide applications and, if so, what mechanism is involved.
- 2) Complete the analyses of the data on invertebrates
- 3) To study the effect of dosage and time of application on the efficiency and ecological impact of the pesticide with a view to improving effectiveness in reducing mosquitoes as well as minimizing impact on the ecosystem

DURATION
OF PROJECT

5 YEARS

PRESENT
YEAR IS

4 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT
\$42,060

CURRENT YEAR
\$8,700

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Interim report received December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Compare the responses of bacteria, algae and invertebrates to experimental and operational applications of mosquito larvicides

KEY WORDS:

Bacteria, Algae, Invertebrates, Operational, Mosquito larvicides.

PRINCIPLE INVESTIGATOR
AND AFFILIATION

C. D. Fowle and M. G. Boyer,
York University

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To compare the responses of bacteria, algae and invertebrates to experimental and operational applications of mosquito larvicides

DESCRIPTION:

Monitor municipal mosquito control programs which use Dursban or Abate in order to compare the impact of field applications with results from the experimental work.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Interim report received December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH:

Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

Linuron and Chlorbromuron residues in organic soils used for
vegetable production in southwestern Ontario

KEY WORDS:

Linuron, Chlorbromuron, Residues, Organic Soils

PRINCIPLE INVESTIGATOR
AND AFFILIATION

C. I. Mayfield,
University of Waterloo

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine Linuron and Chlorbromuron residues in organic
soils used for vegetable production in southwestern Ontario

DESCRIPTION:

Extensive field sampling on sites known to have been treated
with Linuron and Chlorbromuron.

Carry out residual analysis

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Interim Report received December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



BRANCH: Pollution Control

DATE: April 27, 1977

PROJECT TITLE:

The effect of mosquito larvicides on algal productivity and the uptake of inorganic substrates by phytoplankton

KEY WORDS:

Mosquito Larvicides, Algae, Phytoplankton

PRINCIPLE INVESTIGATOR
AND AFFILIATION

B. Colman,
York University

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To study the effect of mosquito larvicides on algal productivity
and the uptake of inorganic substrates by phytoplankton

DESCRIPTION:

To determine the effect of low concentrations of Chloropyriphos on rates of carbon incorporation, phosphate uptake and nitrate uptake by the phytoplankton populations of the ponds.

To develop a method of measuring photorespiration in situ in the ponds.

To carry out laboratory experiments on the effect of Chloropyriphos on the growth, photosynthesis, photorespiration and carbon excretion of photoplankton.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2nd YEAR

REPORTING
DATE December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Interim report received December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Will be reported in the OPAC Research Assessment Report for 1976-77



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: April 5, 1977

PROJECT TITLE:

I.J.C. - PLUARG Study of Septic Tank Discharges

KEY WORDS:

Discharge, Water Quality, Great Lakes

PRINCIPLE INVESTIGATOR
AND AFFILIATION

H.T. Chan, Applied Sciences Section,
Pollution Control Branch

LIAISON OFFICER
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section,
Pollution Control Branch

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the effect of septic tank discharges on the Great Lakes.

DESCRIPTION:

Monitoring existing installations to determine contaminants reaching
the Great Lakes.

DURATION
OF PROJECT

4
— — YEARS

PRESENT
YEAR IS

4
— — YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☐
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY ☒
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE:

PROJECT TITLE: Correlation of Percolation Test with Transmissibility

KEY WORDS: Percolation, Transmissibility

PRINCIPLE INVESTIGATOR H.T. Chan, Applied Sciences Section,
AND AFFILIATION Pollution Control Branch

LIAISON OFFICER M.B. Fielding, Applied Sciences Section,
OR SUPERVISOR Pollution Control Branch

RESEARCH INTERNAL ☒ UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
CATEGORY: GRANT — SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To rate standard percolation test to the actual transmissibility
of clay soil.

DESCRIPTION: Field trials to obtain test data of the actual correlation.

DURATION OF PROJECT — 3 — YEARS PRESENT YEAR IS — 2 — YEAR REPORTING DATE December, 1978

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK ☒ PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

DATE:

Pollution Control

PROJECT TITLE: Water Main Insulation

KEY WORDS:

Buried water mains, Insulation

PRINCIPLE INVESTIGATOR AND AFFILIATION A. Cohen, Applied Sciences Section,
Pollution Control Branch

LIAISON OFFICER OR SUPERVISOR M.B. Fielding, Applied Sciences Section,
Pollution Control Branch

RESEARCH CATEGORY: INTERNAL X GRANT UNSOLICITED CONTRACT MULTI-YEAR PROJECT SOLICITED CONTRACT CONCURRENT PROJECT

OBJECTIVE:

To determine the effectiveness of insulation for buried water mains.

DESCRIPTION:

Monitoring soil temperature over and around a buried water main.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED?

Report on completion

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: April 5, 1977

PROJECT TITLE:

Underground Movement of Contaminants

KEY WORDS:

Sewage Effluent, Underground Flow, Contaminant Recovery

PRINCIPLE INVESTIGATOR
AND AFFILIATION

N. Ehlert, Applied Sciences Section
Pollution Control Branch

LIAISON OFFICER
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section,
Pollution Control Branch

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the subsurface movement of land-disposed municipal
sewage treatment plant effluent.

DESCRIPTION:

The subsurface injection and recovery of contaminants in
municipal sewage treatment plant effluent.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

4 YEAR

REPORTING
DATE Sept. 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Pollution Control

DATE:

PROJECT TITLE:

Raised Tile Field

KEY WORDS:

Raised Bed, Tile Field, Effluent Treatment, Disposal

PRINCIPLE INVESTIGATOR
AND AFFILIATION

M. Brandes, Applied Sciences Section,
Pollution Control Branch

LIAISON OFFICER
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section,
Pollution Control Branch

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the effectiveness of a raised tile bed in treating
septic tank effluent.

DESCRIPTION:

A pilot plant field study with full monitoring.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

3 YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Report on completion

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

Sand Filtration of Septic Tank Effluent

KEY WORDS:

Filtration, Effluent Treatment, Septic Tank, Purification

PRINCIPLE INVESTIGATOR
AND AFFILIATION

N.A. Chowdhry, Applied Sciences Section,
Pollution Control Branch

LIAISON OFFICER
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section,
Pollution Control Branch

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To provide an alternative disposal system to a conventional tile field
bed.

DESCRIPTION:

The operation and monitoring of sand filters on a septic tank
effluent.

DURATION
OF PROJECT

5 YEARS

PRESENT
YEAR IS

3 YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR X
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Report on completion

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

DATE:

Pollution Control

PROJECT TITLE:

Large Scale Tile Field

KEY WORDS:

Sewage Effluent, Soil Disposal

PRINCIPLE INVESTIGATOR
AND AFFILIATION

N. Ehlert, Applied Sciences Section
Pollution Control Branch

LIAISON OFFICER
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section,
Pollution Control Branch

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the effects of discharging large volumes of sewage effluent
($>10,000$ gpd) in sub-surface soil systems.

DESCRIPTION:

Effluent from an extended aeration STP is discharged by a dosing system,
to a 1.25 acre tile field. Chemical and hydraulic parameters are
monitored by means of a well point net.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR ☒
WORK PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ PROJECT
OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE: Upgrading of Lagoon Effluents

KEY WORDS: Unit processes, dual media filtration, dissolved air floatation, micro-straining, rotating biological contactor.

PRINCIPLE INVESTIGATOR
AND AFFILIATION

LIAISON OFFICER
OR SUPERVISOR S. A. Black, Ministry of the Environment

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To determine the effluent quality attainable by applying standard unit processes to the treatment of lagoon effluents.

DESCRIPTION:

Unit processes investigated include dual media filtration, dissolved air floatation, micro-straining and the biological contactor.

DURATION OF PROJECT 1½ YEARS PRESENT YEAR IS 2nd YEAR REPORTING DATE December 1976

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM ——— SPECIAL MINISTRY FUNDING ——— JOINTLY FUNDED PROJECT X OTHER ———

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Biological Nitrification-Denitrification Process Evaluation

KEY WORDS:

Biological nitrification-denitrification, single sludge, full-scale

PRINCIPLE INVESTIGATOR
AND AFFILIATION

A. Smith, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

S. A. Black

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To determine the operational parameters and the treatment capabilities of the biological nitrification-denitrification process.

DESCRIPTION:

Laboratory, pilot scale and full-scale evaluations have been conducted on the single-sludge process in order to optimize design criteria such as: detention times for aeration and denitrification, mixed liquor suspended solids, sludge age, sludge return rates, methanol dosages, etc.

DURATION
OF PROJECT

5 YEARS

PRESENT
YEAR IS

5th YEAR

REPORTING
DATE

March 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE: Thermophylic Anaerobic Digestion

KEY WORDS: Thermophylic anaerobic digestion, operating parameters, efficiency

PRINCIPLE INVESTIGATOR
AND AFFILIATION J. Smart, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR S. A. Black

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ☒
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To determine the operating parameters, efficiency and economics of the thermophylic anaerobic digestion process for municipal sewage sludge treatment.

DESCRIPTION:

Full-scale evaluation of the thermophylic digestion process has been conducted at temperatures of 135°F and at organic loadings ranging from 0.08 to 0.4 lb vs/ft³/day.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	<u>March 1977</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	<input checked="" type="checkbox"/>	OTHER ———
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



BRANCH:

Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Effluent Disinfection

KEY WORDS:

Comparison of disinfection techniques, chlorine, chlorine dioxide, ozone

PRINCIPLE INVESTIGATOR
AND AFFILIATION

F. A. Tonelli, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

S. A. Black

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To compare the efficiencies, advantages and disadvantages of various disinfection techniques and to evaluate the toxicities of the effluents produced.

DESCRIPTION:

Studies have been conducted with chlorine, ozone and chlorine dioxide to compare efficiencies of bacterial and virological disinfection of various activated sludge effluents (i.e. nitrified, denitrified, conventional).

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

3rd YEAR

REPORTING
DATE

March 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Sewage Effluent Disinfection with Chlorine

KEY WORDS:

Chlorination, optimization of mixing and contact, chlorine toxicity

PRINCIPLE INVESTIGATOR
AND AFFILIATION

F. A. Tonelli, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

S. A. Black

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

- 1) To confirm the bactericidal importance of various controllable factors in the disinfection of secondary effluent by chlorination.
- 2) To evaluate a chlorine disinfection system containing optimal process stages with respect to overall bactericidal performance and relative contribution of each stage.

DESCRIPTION:

On a pilot field scale system evaluations will be made to optimize the effectiveness of chlorine in the disinfection of sewage effluents to reduce the cost of the disinfection process and to reduce the unit rate of emission of chlorine-induced toxicity in WPCP effluents.

DURATION
OF PROJECT

1 YEARS PRESENT
YEAR IS 1st YEAR

REPORTING
DATE December 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Pollution Control

DATE:

August 18, 1976

PROJECT TITLE:

Use of Fly-ash in Wastewater Treatment

KEY WORDS:

Fly-ash, activated carbon, organics, municipal wastewater

PRINCIPLE INVESTIGATOR

AND AFFILIATION

V. Hraseova, Ministry of the Environment

LIAISON OFFICER

OR SUPERVISOR

S. A. Black

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To evaluate the use of variously treated and prepared fly-ash material for the treatment of sewage effluent for organics removal.

DESCRIPTION:

Using pilot plant equipment, use of regular, high carbon and partially activated fly-ash materials is compared with commercially available activated carbon for the removal of dissolved organics from sewage treatment plant effluents.

DURATION
OF PROJECT

1½ YEARS

PRESENT
YEAR IS

2nd YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR X
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Sewage Sludge Application to Land Runoff and Groundwater Pollution

KEY WORDS:

Sewage sludge, agricultural land, nutrients, heavy metals, surface water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

P. DeAngelis, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

S. A. Black

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT ^X —
CONCURRENT PROJECT —

OBJECTIVE:

To determine the contribution of nutrients and heavy metals to surface and groundwater through the application of sewage sludge to agricultural lands.

DESCRIPTION:

Two field sites are being studied. Surface water runoff quality and quantity and groundwater quality is being determined.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

3rd YEAR

REPORTING
DATE

June 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED LJC
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Aerated Lagoon Evaluation

KEY WORDS:

Aerated lagoon, design, operation

PRINCIPLE INVESTIGATOR
AND AFFILIATION

W. Lewandowski, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

S. A. Black

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To conduct a detailed evaluation of existing aerated lagoons in Ontario to optimize design and operational criteria.

DESCRIPTION:

This project involves one-week summer and winter evaluations of 5 aerated lagoon system installations in the province. Factors such as: treatment efficiency, aeration capacity, mixing capabilities, etc. will be determined and evaluated.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

— YEAR

REPORTING
DATE July, 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE: Nitrification of Sewage Treatment Plant Effluents

KEY WORDS: Nitrification, secondary effluent, rotating biological contactor, fixed bed reactor

PRINCIPLE INVESTIGATOR
AND AFFILIATION V. Hraseova, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR R. Khettry

RESEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

To evaluate unit processes suitable for providing high degrees nitrification of secondary effluents.

DESCRIPTION:

Pilot equipment has been installed at an operating sewage treatment plant to determine operational parameters and efficiencies of the rotating biological contactor and a fixed bed reactor for nitrifying secondary effluent.

DURATION OF PROJECT: 1 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE: December 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM X SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Users Manual for Flow Monitoring Techniques

KEY WORDS:

Manual, flow monitoring, Ontario, theoretical design, system design

PRINCIPLE INVESTIGATOR
AND AFFILIATION

G. Zukovs, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

F. A. Tonelli

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

Based upon field evaluation of equipment and systems, a manual of flow monitoring techniques covering Ontario conditions and using equipment and systems readily available on the Ontario market will be prepared.

DESCRIPTION:

The manual will provide theoretical background, system design and installation information in a practical user oriented manner.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2nd YEAR

REPORTING
DATE

March 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Assistance from CCIW.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Arsenic Precipitation from Mine Drainage

KEY WORDS:

Arsenic pollution, groundwaters, surface waters, precipitation techniques

PRINCIPLE INVESTIGATOR
AND AFFILIATION

V. Hraseova, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

F. A. Tonelli

RESEARCH
CATEGORY:

INTERNAL ☒ —
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To explore and optimize precipitation techniques and methods of effectively controlling arsenic pollution of ground and surface waters in the vicinity of an abandoned gold mine.

DESCRIPTION:

The study initially theoretically evaluates various precipitation techniques, followed by jar tests treatments and finally by full-scale evaluation.

DURATION OF PROJECT	<u>1 1/2</u> YEARS	PRESENT YEAR IS	_____ YEAR	REPORTING DATE	<u>August 1976</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Assessment of Municipal Bypass Flow

KEY WORDS:

Quality, quantity, municipal bypass flows

PRINCIPLE INVESTIGATOR

AND AFFILIATION

G. Zukovs, Ministry of the Environment

LIAISON OFFICER

OR SUPERVISOR

F. A. Tonelli

RESEARCH

CATEGORY:

INTERNAL X

GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To collect data on the quality and quantity of municipal sewerage bypass flows.

DESCRIPTION:

Installations were made at four municipalities, one with partly combined and three with separate sewer systems with varying degrees of bypass activity. Attempts will be made to relate the quality and quantity of bypass flow to physical and environmental factors associated with each municipality.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

4th YEAR

REPORTING
DATE

March 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED COA
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE: Stormwater Treatment

KEY WORDS: Stormflow treatment, combined sewer, screening

PRINCIPLE INVESTIGATOR
AND AFFILIATION H. Kronis, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR F. A. Tonelli

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To determine the absolute and relative efficiencies of
highrate mesh screens for the treatment of stormflow.

DESCRIPTION: Evaluations of various proprietary systems have been
conducted on a field scale. Systems evaluated include
a screen centrifuge and various stationary screening
devices.

DURATION OF PROJECT — 4 — YEARS PRESENT YEAR IS 4th YEAR REPORTING DATE March 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT X OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH:

Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Physical-Chemical Treatment of Wastewater

KEY WORDS: Physical-chemical processes, municipal wastewater, powdered activated carbon, granular activated carbon, sand filtration, chemical precipitation ion exchange.

PRINCIPLE INVESTIGATOR

AND AFFILIATION

R. Duff, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

F. A. Tonelli

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT ☒
CONCURRENT PROJECT —

OBJECTIVE:

To investigate on a field scale, the application of physical/chemical processes in conjunction with, and separate from, biological treatment for the partial-to-complete treatment of municipal wastewater.

DESCRIPTION:

Treatment processes being evaluated include the use of powdered and granular activated carbon, sand filtration, chemical precipitation and ion exchange.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

4th YEAR

REPORTING
DATE

March 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED ☒
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Pollution Control

DATE: August 18, 1976

PROJECT TITLE:

Physical Treatment System for Stormwater

KEY WORDS:

PRINCIPLE INVESTIGATOR
AND AFFILIATION

R. Duff, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR

F. A. Tonelli

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To conduct a state-of-the-art review of various unit processes
for the treatment of storm water.

DESCRIPTION:

The study will be carried out by a combination of literature review,
discussions with officials in the EPA and other agencies and visits to
demonstration projects.

Factors considered will include:

- Performance, availability, relative capital and operating costs
of various systems;
- Evaluation of individual installations for potential wider applicability;
- Determining to what extent existing equipment design criteria,
already available, and sewage characteristics at existing installations,
are adequate to predict performance and cost at other locations.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE July 1977

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: March 23/77

PROJECT TITLE:
Flotation in Water Treatment

KEY WORDS:
Flotation

PRINCIPLE INVESTIGATOR
AND AFFILIATION A. Oda - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR K.J. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:
To study the use of the flotation principle
as applied to potable water clarification

DESCRIPTION:

The clarification of water by flotation rather than sedimentation appears to have several advantages: increased rate of throughput with a consequent smaller unit, solids such as algae which are difficult to settle can be removed, the final sludge concentration is greater (about 4-6%) making disposal more economic.

DURATION OF PROJECT	3 YEARS	PRESENT YEAR IS	2 YEAR	REPORTING DATE	Dec/78
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: March 23/77

PROJECT TITLE: Asbestos in Drinking Water Supplies

KEY WORDS: Asbestos, Water

PRINCIPLE INVESTIGATOR
AND AFFILIATION R.B. Hunsinger - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR K.J. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To survey asbestos levels in raw water and drinking water throughout Ontario.

DESCRIPTION: Raw and potable water supplies throughout Ontario will be surveyed for asbestos levels. The data will be tabulated with raw water type, water treatment plant process and finished water quality

DURATION OF PROJECT	on-going	PRESENT YEAR IS	5	YEAR	REPORTING DATE
YEARS					
BUDGET:		TOTAL DOLLARS		MAN YEARS	
		TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	<input type="checkbox"/>	JOINTLY FUNDED PROJECT
					OTHER

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Pollution Control

DATE:

March 23/77

PROJECT TITLE:

Manganese Sequestration

KEY WORDS:

Manganese

PRINCIPLE INVESTIGATOR
AND AFFILIATION

F.J. Dart - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To control manganese in water supplies

DESCRIPTION:

Control of manganese by sequestration with hydrogen peroxide addition to the raw water will be studied and further optimised

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

March 1978

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH:

Pollution Control

DATE:

March 23/77

PROJECT TITLE:

Ozonation of Potable Water Supplies

KEY WORDS:

Ozone

PRINCIPLE INVESTIGATOR

AND AFFILIATION

A. Oda - Water Technology Section

LIAISON OFFICER

OR SUPERVISOR

K.J. Roberts

RESEARCH

CATEGORY:

INTERNAL ☒

GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To investigate the use of ozone in potable water treatment.

DESCRIPTION:

Laboratory bench scale and pilot plant studies of ozonation as applied to potable water treatment. Especially investigated will be coloured waters with low turbidity, and the use of ozone as an alternative disinfectant to avoid chlorinated organic by-products. This is essentially an on-going area of study e.g. a report on an investigation at Smiths Falls WTP has been prepared.

DURATION
OF PROJECT

——— YEARS

PRESENT

YEAR IS

——— YEAR

REPORTING

DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

Pilot Plant

SOURCE OF

FUNDS:

REGULAR ☒

WORK ☐

PROGRAM

SPECIAL

MINISTRY ☐

FUNDING

JOINTLY

FUNDED ☐

PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Reports are written for each investigation

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: March 23/77

PROJECT TITLE: Distribution System - Small Animal Survey

KEY WORDS: Distribution, Animals

PRINCIPLE INVESTIGATOR
AND AFFILIATION H. Graham - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR K. Roberts

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To study and investigate removal methods, small animals (e.g. snails, nematodes) in distribution systems.

DESCRIPTION: Sample collection and survey following foam-swab cleaning of distribution mains; isolation, identification and enumeration of animal species.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Dec/78</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR <u>X</u> WORK PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Pollution Control

DATE:

March 23/77

PROJECT TITLE:

Distribution System Survey

KEY WORDS:

Distribution System

PRINCIPLE INVESTIGATOR
AND AFFILIATION

A. Vajdic - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

Examine bacteriological quality in distribution systems and obtain correlation with raw and treated water quality parameters.

DESCRIPTION:

Sampling survey of raw and treated water and water in distribution systems from a number of treatment plants.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

3 YEAR

REPORTING
DATE

Aug/77

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR ☒
WORK PROGRAM

SPECIAL
MINISTRY FUNDING ☐

JOINTLY
FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH:

Pollution Control

DATE:

March 23/77

PROJECT TITLE:

Parasites in Sewage Sludges

KEY WORDS:

Parasites, Sludge

PRINCIPLE INVESTIGATOR
AND AFFILIATION

H.J. Graham - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT X

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To assess the health hazard associated with parasites
in sewage sludges used on land.

DESCRIPTION:

Isolation, identification and enumeration of
parasites, ova and cysts.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

3rd YEAR

REPORTING
DATE

March 1978

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED COA
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Pollution Control

DATE: March 23/77

PROJECT TITLE:

Asbestos Removal from Potable Water

KEY WORDS: Asbestos, Potable Water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

R.B. Hunsinger - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL ~~XX~~
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To investigate the optimisation of asbestos removal
during water treatment

DESCRIPTION:

Potable water treatment optimised for turbidity removal
and further optimised (if necessary by polymer addition).

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE April, 1977

BUDGET: M.O.E.
funds only

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X OTHER —
PROJECT with
CCIW

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Joint Project with CCIW



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: March 23/77

PROJECT TITLE:

Chlorinated Organic Formation and Reduction
Drinking Water Treatment

KEY WORDS:

Chl Org.

PRINCIPLE INVESTIGATOR
AND AFFILIATION

C. Fung - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To study the formation of chlorinated organics
following the chlorine treatment slip of water treatment
and to investigate methods of reduction and removal of
such compounds formed.

DESCRIPTION:

- Provincial Survey of types and magnitudes of chlorinated organics in Ontario drinking waters
- investigate methods to optimise chlorinated organic removal during water treatment

DURATION
OF PROJECT

3 YEARS PRESENT YEAR IS 2 YEAR

REPORTING DATE March/78

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR X
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Work in conjunction with Laboratory Branch.



BRANCH: Resource Recovery

DATE: March 31, 1977

PROJECT TITLE:

Windrow Composting of Refuse and Sewage Sludge

KEY WORDS: Refuse, Wastewater sludge, Compost

PRINCIPLE INVESTIGATOR

AND AFFILIATION Pierre M. Philippe, President, Grow-Rich Organic Fertilizers Ltd.

LIAISON OFFICER

OR SUPERVISOR B. I. Boyko, Technology and Market Development Section

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT XX MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE:

To study windrow composting of municipal residential refuse with
sewage sludge.

DESCRIPTION:

Approximately 50 tons of refuse from the Municipality of Windsor was hand sorted, mixed with sewage sludge, windrowed, shredded and then further windrowed. Equipment and labour was supplied by Grow-Rich Organic Fertilizers Ltd. and the study was conducted at the Company's location in Oldcastle (20 miles from Windsor). Sampling and analyses were conducted by Ministry staff.

DURATION OF PROJECT 0.3 YEARS PRESENT YEAR IS -- YEAR REPORTING DATE August, 1977

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK XX PROGRAM SPECIAL MINISTRY ——— FUNDING JOINTLY FUNDED ——— PROJECT OTHER ———

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS:



BRANCH: Resource Recovery

DATE: April 5, 1977

PROJECT TITLE:

Innovative Refuse Collection Pilot Study

KEY WORDS:

Refuse, Collection

PRINCIPLE INVESTIGATOR

AND AFFILIATION

W. Coulter, City of Windsor

LIAISON OFFICER

OR SUPERVISOR

B. I. Boyko, Technology and Market Development

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐

CATEGORY:

GRANT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To investigate problems of mechanized waste collection and to conduct research related to waste collection and different methods of waste collection

DESCRIPTION:

Two different types of mechanized residential refuse collection systems have been placed in service on three collection routes within the City of Windsor. The study commenced in October, 1976 and will continue for a one-year period. Collection costs and productivity measurements will be used to assess results as well as potential applicability to other municipalities in Ontario.

DURATION
OF PROJECT

1.0 YEARS

PRESENT
YEAR IS

1.0 YEAR

REPORTING
DATE

March, 1978

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR ☒
WORK PROGRAM

SPECIAL ☐
MINISTRY FUNDING

JOINTLY ☐
FUNDED PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:

Ministry funding supplied for capital equipment only. Equipment maintenance and data collection, responsibility of the City of Windsor. Ministry to prepare report.



BRANCH: Resource Recovery

DATE: April 6, 1977

PROJECT TITLE:

Use of Refuse Derived Fuel in Cement Kilns

KEY WORDS: Refuse, Energy, Refuse Derived Fuel (RDF)

PRINCIPLE INVESTIGATOR P. J. Provias, Resource Recovery Branch, MOE
AND AFFILIATION R. M. Brannen, Canada Cement Lafarge Limited

LIAISON OFFICER
OR SUPERVISOR B. I. Boyko, Technology and Market Development, MOE

RESEARCH CATEGORY: INTERNAL X UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X
GRANT — SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To investigate the use of refuse derived fuel (RDF) as a fuel
supplement in cement kiln operation.

DESCRIPTION:

A demonstration project using RDF as a supplement to fossil fuels will
be conducted at the Company's Woodstock plant. RDF, prepared at the
Experimental Plant for Resource Recovery, will be used up to a maximum of
50 percent of the fuel energy supply, if feasible. Ministry funding will
cover the engineering, supply and installation of the materials receiving
and pneumatic handling system. Air emission testing prior to and during
the firing phases of the study will be conducted by the Ministry.

DURATION OF PROJECT 2 YEARS PRESENT YEAR IS 2nd YEAR REPORTING DATE September, 1978

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR
SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS:



Ontario

BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE: Penetang-Midland Study

KEY WORDS:

Phytoplankton, nutrients, primary production, microbiology

PRINCIPLE INVESTIGATOR
AND AFFILIATION

G. Robinson

LIAISON OFFICER
OR SUPERVISOR

P. Dillon

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

(a) To determine the response of the aquatic ecosystem to the phosphorus-removal program at municipal sewage treatment plants in the area from Penetanguishene to Waubesaushene. (b) To determine the effectiveness of present remedial programs at municipal STP's and to determine the needs for further abatement measures. (c) To determine compliance of water quality conditions with MOE criteria and IJC objectives.

DESCRIPTION:

Samples for phytoplankton, chlorophyll a, nutrients and a number of other chemical parameters are collected bi-weekly from early May until late November at ten stations within the area. In addition, primary production at five of the stations (using the ^{14}C technique), incident light, and temperature profiles are measured concurrently. In 1976, approximately 20 bacteriological samples will be collected bi-weekly from stations in the same area.

DURATION OF PROJECT	<u>5</u> YEARS	PRESENT YEAR IS	<u>5</u> YEAR	REPORTING DATE	<u>Fall 1978</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	OTHER
	WORK	MINISTRY	FUNDED <input checked="" type="checkbox"/>	
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE: Douglas Point - Bruce Nuclear Power Development
Water Quality Monitoring

KEY WORDS: Radioactivity, waste heat, nuclear power development, thermal structure, sulphur
cycle bacteria

PRINCIPLE INVESTIGATOR
AND AFFILIATION I. Ross

LIAISON OFFICER
OR SUPERVISOR J.D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

(a) To determine compliance with MOE criteria/guidelines and IJC objectives for water quality. (b) To determine the environmental impact of the Douglas Point Generating Station, Bruce Heavy Water Plant, and Bruce A Generating Station. (c) To establish the operational baseline off the Bruce A Generating Station. (d) Monitoring radioactivity, heat and H₂S to test compliance with IJC objectives.

DESCRIPTION:

This year, the sampling area has been expanded in the vicinity of the Bruce Nuclear Power Development, to help delineate the environmental effect of the future thermal discharge of the Bruce A Generating Station. Approximately 35 stations will be sampled on four discrete cruises in 1976. Selected water quality and related parameters involve: thermal structure, sulphur cycle bacteria, sulphates, sulphide and radioactivity.

DURATION OF PROJECT	<u>Annually</u> YEAR	PRESENT YEAR IS	<u>11</u> YEAR	REPORTING DATE	<u>Annually</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY <input checked="" type="checkbox"/> FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>
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IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE: St. Marys River Monitoring

KEY WORDS: Nutrients, cyanide, phenols, health indicator bacteria

PRINCIPLE INVESTIGATOR
AND AFFILIATION N. Herzog

LIAISON OFFICER
OR SUPERVISOR J.D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

(a) To determine compliance with MOE criteria and IJC objectives. (b) To determine the effectiveness of present remedial programs and the need for further abatement measures.

DESCRIPTION:

Water quality monitoring at selected transects in the river including the head and below major waste sources will be carried out during two surveys in 1976. Each survey will consist of three monitoring runs of 49 locations on nine transects. Significant parameters include nutrients, cyanide, phenols and health indicator bacteria. Details of sampling locations and additional parameters are contained in the cruise plan.

DURATION OF PROJECT	Annually YEAR\$	PRESENT YEAR IS	10 YEAR	REPORTING DATE	Annually
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input checked="" type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



Ontario

BRANCH: **Water Resources**

DATE: May 6, 1977

PROJECT TITLE: **Phytoplankton and Water Chemistry Analyses at Water Intakes along the Ontario Shoreline of the Great Lakes**

KEY WORDS: **Long term trends, phytoplankton, water quality**

PRINCIPLE INVESTIGATOR
AND AFFILIATION **G. Hopkins**

LIAISON OFFICER
OR SUPERVISOR **K. Nicholls**

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT <u> </u>	MULTI-YEAR PROJECT <u> </u>
CATEGORY:	GRANT <u> </u>	SOLICITED CONTRACT <u> </u>	CONCURRENT PROJECT <u> </u>

OBJECTIVE:

(a) To identify and enumerate phytoplankton together with nutrient analyses from municipal waterwork intakes. (b) To evaluate long term trends in water quality and in species abundance and composition as an indicator of changing water quality.

DESCRIPTION:

Phytoplankton samples together with water quality parameters such as total phosphorus, soluble reactive phosphorus, ammonia-nitrogen, nitrate-nitrite nitrogen, total kjeldahl nitrogen, silica, chloride, chlorophyll a will be analyzed on a weekly basis at 11 water intakes along the Ontario shoreline of lakes Huron, Erie, Ontario and St. Lawrence River.

DURATION OF PROJECT	<u>Annually</u> YEARS	PRESENT YEAR IS	<u>10</u> YEAR	REPORTING DATE	<u>Annually</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR WORK <u> </u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u>X</u> PROJECT	OTHER <u> </u>
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IS A REPORT ANTICIPATED? **Yes**

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE: Remote Sensing Studies

KEY WORDS: Suspended solids, tributary discharges, turbidity, thermal infrared scanning, coastal process, water quality, thermal effects, surveillance planning, waste heat dispersion, Cladophora

PRINCIPLE INVESTIGATOR
AND AFFILIATION I. Ross

LIAISON OFFICER
OR SUPERVISOR J.D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: (a) To use suspended solids as a tracer in determining the areal distribution of major tributary discharges to Lake Huron - to map the areal distribution of turbidity in the vicinity of the Maitland River, Ausable and Saugeen river mouths. (b) Turbidity and apparent surface temperatures (thermal infrared scanning) will be used to determine the nature of seasonal, coastal and impoundment process active in the Canadian nearshore regions of Lake Huron. (c) To determine the major areal differences in nearshore water quality (i.e. turbidity) from the period of peak spring runoff to low summer runoff. (d) To map spring and midsummer surface temperature patterns in determining the role of thermal effects on the areal pattern of suspended solids. (e) To optimize the location of in situ water quality sampling sites. (f) To determine the operating parameters of remote thermal surveillance in the Ontario nearshore regions of the Great Lakes. (g) To determine the nature and extent of waste heat dispersion from the Pickering and R.L. Hearn Generating Stations. (h) To map the aerial extent of Cladophora growth in Toronto Harbour. (i) To determine and map the pathway of suspended solids loadings from the Don River through the Inner Harbour to the Outer Harbour and eventually to Lake Ontario.

DESCRIPTION:

Two aerial flight proposals using aerial cameras and thermal infra-red scanning have been forwarded to the Canada Centre for Remote Sensing. Recent water quality studies (1973-74) in the Ontario nearshore waters of Lake Huron indicated impaired water quality, especially in terms of suspended solids in the region from Kettle Point to Southampton, Ontario

DURATION OF PROJECT 5 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE Annually

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM MINISTRY FUNDING SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE:

Assessment of Water Quality Trends and Zones of Influence in Lake Ontario

KEY WORDS: Nutrients bacteriological, biomass indicators, radioactivity

PRINCIPLE INVESTIGATOR
AND AFFILIATION

M. Griffiths

LIAISON OFFICER
OR SUPERVISOR

J.D. Kinhead

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

(a) To update information on trends in water quality in the nearshore zone. (b) To determine violations of the IJC Objectives and Ministry Criteria, (c) To provide direction to MTRCA in monitoring the effects of landfill operations. (d) To detect inshore offshore water quality gradient. (e) To determine radionuclide levels in the vicinity of the Pickering Generating Station.

DESCRIPTION: Field studies will be carried out during March, June, August and October. A system of transect extending to 50 m depth contour would be monitored together with the regular monitoring stations which amounts to 100 stations. Water quality analyses would include nutrients bacteriological and biomass indicators parameters. Radioactivity monitoring at Pickering Generating Stations will be carried out four times at eight stations off the Pickering site.

DURATION OF PROJECT	5 YEARS	PRESENT YEAR IS	2 YEAR	REPORTING DATE	Annually
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	X	OTHER
IS A REPORT ANTICIPATED?	Yes.				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE: Project Quinte

KEY WORDS: Phytoplankton, nutrients, primary production

PRINCIPLE INVESTIGATOR
AND AFFILIATION G. Robinson

LIAISON OFFICER
OR SUPERVISOR P. Dillon

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the response of the aquatic ecosystem to the phosphorus-removal program at municipal sewage treatment plants in the Bay of Quinte area. The work is being carried out as part of a larger multi-agency (MOE, CCIW, MNR, Queen's University and University of Guelph) study.

DESCRIPTION:

Samples for phytoplankton, chlorophyll a, nutrients and a number of other chemical parameters are collected weekly from early May until mid-October at eight stations within the bay. In addition, primary production (using the dissolved oxygen technique), incident light, and temperature profiles are measured concurrently. Phytoplankton results are expressed in terms of total cell volume and areal standard units.

DURATION OF PROJECT	<u>9</u> YEARS	PRESENT YEAR IS	<u>5</u> YEAR	REPORTING DATE	<u>Annually</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK <u>—</u> PROGRAM	SPECIAL MINISTRY <u>—</u> FUNDING	JOINTLY FUNDED <u>X</u> PROJECT	OTHER <u>—</u>	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE:

Toronto Central Waterfront

KEY WORDS:

Water and sediment, benthic fauna

PRINCIPLE INVESTIGATOR
AND AFFILIATION

M. Griffiths and E. Leggatt

LIAISON OFFICER
OR SUPERVISOR

J.D. Kinhead

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

- (a) To determine the extent of non-compliance with MOE Criteria and IJC Objectives.
(b) To identify sources contributing to water quality impairment during wet and dry weather conditions. (c) To establish the terms of reference for an investigation of water quality in the Inner Harbour.

DESCRIPTION:

Field studies will be conducted during May, July and September. Other cruises will be carried out just after storm events. These assessments will include water and sediment chemistry and benthic fauna evaluation. The sampling will be intensified in problem areas identified in the report (Water Information Base) prepared earlier for the Central Waterfront Planning Committee.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE Annually

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE:

Lake Erie Nearshore Waters

KEY WORDS:

Nutrients, microbiology, biomass

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Y. Hamdy

LIAISON OFFICER
OR SUPERVISOR

J.D. Kinhead

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

- (a) To determine the effect of the Detroit River water quality on the western basin on Lake Erie during the spring runoff. (b) To establish a baseline for the eastern basin of the lake for assessing the future impact of industrial and municipal development. (c) To determine the effect of the Grand River discharge during spring runoff on the eastern basin of the lake.

DESCRIPTION:

A spring survey of the western basin of Lake Erie (Wheatley to Amherstburg) will be undertaken during five consecutive days in April, including Wheatley Harbour and Leamington. In the eastern basin, four cruises will be carried out during April, June, August and October. A total of 100 stations in both basins will be sampled for nutrients, microbiology and biomass indicators.

DURATION OF PROJECT	<u>5</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Annually</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK <input type="checkbox"/>	MINISTRY <input type="checkbox"/>	FUNDED <input checked="" type="checkbox"/>	OTHER <input type="checkbox"/>
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE: Impact of Municipal and Canning Waste on Nearshore of Western
Basin of Lake Erie

KEY WORDS: Nutrient, bacteriological

PRINCIPLE INVESTIGATOR
AND AFFILIATION Y. Hamdy

LIAISON OFFICER
OR SUPERVISOR J.D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

- (a) To determine the status of compliance with the IJC Objective and MOE Criteria.
(b) To assess the effectiveness of the remedial programs (phosphorus removal) at the water pollution control plant of the Town of Leamington during the Canning season.

DESCRIPTION:

During August water samples for chemical and bacteriological analysis would be collected from a sampling grid extending 4 miles west and 3 miles east of Leamington. The study will include sediment chemistry and benthic fauna evaluation.

DURATION OF PROJECT: 1 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE: August 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT ☒ OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH:

Water Resources

DATE:

May 6, 1977

PROJECT TITLE: Assessment of water quality status of the St. Clair River and continued surveillance of Lake St. Clair sediment mercury levels.

KEY WORDS:

Dissolved organics, trends, water quality, sediment, mercury

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Y. Handy

LIAISON OFFICER

OR SUPERVISOR

J.D. Kinkead

RESEARCH

CATEGORY:

INTERNAL ☒

GRANT ☐

UNSOLICITED CONTRACT ☐

SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐

CONCURRENT PROJECT ☐

OBJECTIVE:

- (a) To determine compliance with the IJC Objective and MOE Criteria.
- (b) To determine the distribution and levels of dissolved organics in effluents from the Petrochemical industries along the Canadian shore.
- (c) To examine trends of mercury levels in the St. Clair system sediments.

DESCRIPTION:

Water quality assessment of the St. Clair River will be conducted during June and September. A system of sampling ranges across the river consisting of nine transects (42 stations) will be sampled three consecutive days during each period. Samples will be analyzed for the conventional water quality parameters. Sediment sampling for mercury will be completed in April and November.

DURATION
OF PROJECT

Annually
YEARS

PRESENT
YEAR IS

10
YEARS

REPORTING
DATE

Annually

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☐
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☒
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE:

Water Quality Monitoring of the Detroit River

KEY WORDS:

Quality control, microbiology, nutrients

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Y. Handy and J. Sweet

LIAISON OFFICER

OR SUPERVISOR

J.D. Kinhead

RESEARCH

CATEGORY:

INTERNAL —

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

- (a) To determine compliance with the IJC Objective and MOE Criteria. (b) To supplement the surveillance program of the Department of Natural Resources of Michigan, U.S.A.
(c) To continue inter-laboratory comparison studies between the Ministry and DNR, Michigan for the Detroit River mouth range.

DESCRIPTION:

Field studies will be conducted during May and September. Water quality sampling of 60 stations would be carried out three times during each cruise. Analyses will be done for the conventional water quality parameters with emphasis on nutrients and chlorides at the river mouth range.

DURATION
OF PROJECT

Annually
YEARS

PRESENT
YEAR IS

10
YEAR

REPORTING
DATE

Annually

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

BRANCH: Water Resources

DATE: May 6, 1977

PROJECT TITLE:

Maitland River Mouth Study

KEY WORDS:

Nutrients, thermal bar, remote sensing

PRINCIPLE INVESTIGATOR
AND AFFILIATION

I. Ross

LIAISON OFFICER
OR SUPERVISOR

J.D. Kinhead

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

- (a) To determine the nature and extent of water quality impairment off the mouth of the Maitland River during spring runoff and low flow periods.
- (b) To determine compliance with MOE Criteria and IJC Objectives for water quality.
- (c) To determine the effect of significant nutrient inputs from upstream diffuse land use sources.
- (d) To determine the levels and trends of nutrients in a nearshore area of Lake Huron.

DESCRIPTION:

Two cruises of 20 stations will be sampled for nutrients, turbidity, suspended solids, bacteria and chlorophyll a. Thermal structure information will also be obtained to verify the presence of thermal bar and the impoundment of nearshore waters during spring. These studies will be complimented by remote sensing studies in the area.

DURATION OF PROJECT 1 YEAR\$ PRESENT YEAR IS YEAR REPORTING DATE October 1977

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK ☐ PROGRAM SPECIAL MINISTRY ☐ FUNDING JOINTLY FUNDED ☒ PROJECT OTHER ☐

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH:

Water Resources

DATE:

May 6, 1977

PROJECT TITLE:

Collingwood Harbour Study

KEY WORDS:

Phosphorus removal, water, sediments

PRINCIPLE INVESTIGATOR
AND AFFILIATION

I. Ross

LIAISON OFFICER
OR SUPERVISOR

J.D. Kinhead

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

- (a) To determine the effectiveness of the phosphorus removal program at Collingwood STP. (b) To determine compliance with MOE Criteria and IJC Objectives.

DESCRIPTION:

12 stations in the harbour and adjacent local waters of Nottawasaga Bay will be sampled for water and sediments during a one week survey in the summer of 1976.

DURATION OF PROJECT 2 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE January 1978

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT X OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Water Resources

1976/77 PROJECTS

DATE:

May 15, 1977

PROJECT TITLE:

Ecological Modelling for River Management

KEY WORDS:

Stream biology, nutrients, dissolved oxygen modelling, Cladophora, Potamogeton.

PRINCIPAL INVESTIGATOR
AND AFFILIATION

L. Wong, Limnology & Toxicity Section
D. Weatherbe, Water Modelling Section

LIAISON OFFICER
OR SUPERVISOR

P. Dillon (L & T), F. Fleischer (W.M.)

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

1. To collect field data for the derivation of growth rates of Cladophora and Potamogeton, as governed by concentrations of phosphorous and nitrogen.
2. To develop guidelines and methodology for the regulation of nutrient levels to modify plant and algae production and resultant variations in dissolved oxygen levels in streams.

DESCRIPTION:

An ecological model based on field data collected by the Limnology & Toxicity Section in studies commencing in 1972 (Thames R.) and continuing in the Grand R. is to be applied under the Grand River Basin Water Management Study.

It is expected that relationships will be established governing the growth rates of river plant and algae species and their effects on the dissolved oxygen levels in the stream. Predictions of changes resulting from control of nutrient inputs will optimize management of streams for waste assimilation and recreation.

DURATION
OF PROJECT

7 YEARS PRESENT
YEAR IS 5 YEARS

REPORTING
DATE annually

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM SPECIAL
MINISTRY X
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Annual technical reports

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:

Research is presently part of a comprehensive basin water management study (Grand R.) designed to develop a management plan for water quality, flood protection, water supply and recreation.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

1976/77 PROJECTS

DATE: May 15, 1977

PROJECT TITLE:

Hydrologic Modelling

KEY WORDS:

Streamflow simulation, parametric modelling, hydrology, snowmelt, stochastic modelling

PRINCIPAL INVESTIGATOR
AND AFFILIATION

L. A. Logan, Water Modelling Section

LIAISON OFFICER
OR SUPERVISOR

F. C. Fleischer, Water Modelling Section

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To derive suitable parametric hydrologic models for use in the simulation and prediction of streamflow and snowmelt runoff processes as governed by various land use and climatic activities in southern Ontario.

DESCRIPTION:

Based on concepts and algorithms developed under the IHD (International Hydrological Decade) research program (1965-74), an operational model MOEHYDR2 has been extracted and implemented for comparative evaluation in the Grand R. basin. Other simulation routines based on the hydrologic balance approach and statistical data generation are being evaluated for use as land and water-management planning tools, operational forecasting of streamflow and snowmelt runoff and the development of reservoir operation policies.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE

annually

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY X
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

To be prepared annually

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Natural Resources, CAB, GRCA

REMARKS:

Work is being conducted as part of an inter-disciplinary effort (Grand River Basin Water Management Study) to develop a total management plan for a major basin in southern Ontario.



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

1976/77 PROJECTS

DATE: May 15, 1977

PROJECT TITLE:

Effluent Dispersion in Shallow Streams

KEY WORDS:

effluent dispersion, mixing zones, modelling

PRINCIPLE INVESTIGATOR

AND AFFILIATION

H.T.P. Gowda, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

F.C. Fleischer

RESEARCH

CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

- OBJECTIVE:
1. To investigate the effects of outfall and channel hydraulic characteristics on effluent dispersion in shallow streams;
 2. To develop relations between mixing zone widths and longitudinal distances, and to estimate mixing zone length using existing relationships;
 3. To predict the distribution of conservative and non-conservative materials in the mixing zones under various flow conditions;
 4. To develop guidelines and criteria for water quality management in mixing zones.

DESCRIPTION:

Field surveys have been carried out in selected southern Ontario streams. During each survey, transverse distributions of tracers-Rhodamine dye injected continuously at the outfall, chloride and conductivity - were measured at several transects below the outfall; depth and velocity measurements were also taken. A few of the studies were related to investigation of the distribution of chlorine residuals in streams. Transverse dispersion coefficients are determined using tracer concentration distribution curves. The attenuation of chlorine residual concentrations by the dispersion process has been evaluated using 2-dimensional, theoretical models available in literature. The effect of flow variations on the distribution of chlorine residuals in mixing zones and on concentration at an arbitrary boundary were investigated. Further investigations are being directed to model verification and guideline development.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

2 YEAR S

REPORTING
DATE

1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR X
WORK PROGRAM

SPECIAL
MINISTRY FUNDING —

JOINTLY
FUNDED PROJECT —

OTHER —

IS A REPORT ANTICIPATED?

1977

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources Branch

DATE: May 16, 1977

PROJECT TITLE: Serpent Harbour Radioactivity and Water Quality Monitoring

KEY WORDS: Water quality, sediment, radioactivity

PRINCIPLE INVESTIGATOR
AND AFFILIATION I. Ross

LIAISON OFFICER
OR SUPERVISOR J.D. Kinhead

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT	—	MULTI-YEAR PROJECT	—
CATEGORY:	GRANT	SOLICITED CONTRACT	—	CONCURRENT PROJECT	—

OBJECTIVE:

- (a) To determine compliance with MOE water quality criteria and IJC objectives.
(b) To verify the trend of diminishing Radium-226 levels and loadings as a result of ongoing abatement programs at upstream mine sites in Elliot Lake. (c) To test compliance with IJC radioactivity objectives.

DESCRIPTION:

Negotiations are underway with regional staff for undertaking the field work; failing this the Great Lakes Surveys Unit will do the sampling which will include up to 20 stations for about two to three times in the year.

DURATION OF PROJECT	<u>Annually</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Annually</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED <u>X</u> PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

1976/77 PROJECTS

DATE: May 18, 1977

PROJECT TITLE:

Thunder Bay Water Quality Studies

KEY WORDS:

Dissolved oxygen, bacteriological

PRINCIPLE INVESTIGATOR

AND AFFILIATION

N. Herzog

LIAISON OFFICER

OR SUPERVISOR

J. Kinhead

RESEARCH

INTERNAL

X

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

CATEGORY:

GRANT

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE:

- (a) To determine compliance with MOE criteria and IJC objectives for water quality.
- (b) To determine the effectiveness of remedial programs and the need for further abatement measures.
- (c) To complement the existing data base with respect to the effects of waste discharges on water quality with particular emphasis on nearshore nutrient levels and bacterial quality.

DESCRIPTION:

This year's program will include an intensive survey in August, during which approximately 14 locations will be monitored to determine existing water quality conditions within the harbour. Emphasis in these studies will be placed on dissolved oxygen measurements and bacteriological parameters.

DURATION
OF PROJECT

1

YEAR

PRESENT

YEAR IS

YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR

WORK

PROGRAM

SPECIAL

MINISTRY

FUNDING

JOINTLY

FUNDED

PROJECT

X

OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

1976/77 PROJECTS

DATE: May 18, 1977

PROJECT TITLE:

Hamilton Harbour Study - Phase II

KEY WORDS: Water quality, sediment, sediment-water chemistry exchange, harbour-lake exchange, physical-chemical processes, modelling, trend analyses.

PRINCIPLE INVESTIGATOR

AND AFFILIATION D. Haffner

LIAISON OFFICER
OR SUPERVISOR

M. Palmer

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

Continued monitoring of Hamilton Harbour water quality to assess the non-compliance with IJC objectives and resultant water quality from operating abatement programs. Determine what further abatement programs are required for compliance. Continue work on determining water quality trends particularly for dissolved oxygen, nutrients and phytoplankton. Measure the exchange between the harbour and Lake Ontario. Measure the sediment oxygen demand and water column oxygen demand.

DESCRIPTION:

Measurement of water quality, bottom sediment quality sediment-water chemistry exchange, harbour-lake exchange, physical-chemical processes, and biological community abundance, distribution and composition.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

2 YEARS

REPORTING
DATE

Annually

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Natural Resources, Harbour Commission, CCIW

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

1976/77 PROJECTS

DATE: May 18, 1977

PROJECT TITLE:

Toronto Harbour Study

KEY WORDS: Water quality, harbour-lake exchange, modelling, trend analysis

PRINCIPLE INVESTIGATOR
AND AFFILIATION

D.J. Poulton

LIAISON OFFICER
OR SUPERVISOR

M. Palmer

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

Continued monitoring of Toronto Harbour water quality to assess the non-compliance with IJC objectives and resultant water quality from operating abatement programs. Determine what further abatement programs are required for compliance. Continue work on determining water quality trends particularly for nutrients and phytoplankton. Measure the exchange between the harbour and Lake Ontario.

DESCRIPTION:

Measurement of water quality, sediment-water chemistry exchange, harbour-lake exchange, physical-chemical processes, and biological community abundance, distribution and composition.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

Annually

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Natural Resources, Harbour Commission, Metro Toronto

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

1976/77 PROJECTS

BRANCH:

Water Resources

DATE:

May 18, 1977

PROJECT TITLE:

Nanticoke Currents and Water Chemistry

KEY WORDS:

Water movement, water chemistry, thermal discharge

PRINCIPLE INVESTIGATOR
AND AFFILIATION

J. Polak

LIAISON OFFICER
OR SUPERVISOR

M. Palmer

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To update the observation of changes in water movement and water chemistry resulting from the thermal discharge from the Ontario Hydro Generating Station, industrial and urban development in the Nanticoke area.

DESCRIPTION:

Recording current meters are in operation and bi-weekly sampling of water chemistry is continuing.

DURATION
OF PROJECT

12 YEARS

PRESENT
YEAR IS

8 YEARS

REPORTING
DATE

Annually

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED X
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Natural Resources, Ontario Hydro

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources - Hydrology & Monitoring Section DATE: June 1, 1977

PROJECT TITLE:

Ground Water Probability Mapping

KEY WORDS:

Ground water; probability; hydrogeology; ground-water mapping

PRINCIPLE INVESTIGATOR

AND AFFILIATION

U. Sibul, Head, Resource Assessment Group

LIAISON OFFICER

OR SUPERVISOR

As above

RESEARCH

CATEGORY:

INTERNAL ☒

GRANT ☐

UNSOLICITED CONTRACT ☐

SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☒

CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the yield of ground water to wells in counties throughout Ontario.

DESCRIPTION:

The project involves mapping of ground-water resources in various counties in the Province. The maps are intended to provide basic ground-water data and interpretations on the availability of ground water throughout a county in order that water supply potentials can be assessed for various uses. These maps indicate the probable yields to wells, depths at which water is found and the depths of static water levels. Ground-water chemistry is also indicated.

DURATION
OF PROJECT

ON-GOING

____ YEARS

PRESENT
YEAR IS

____ YEAR

REPORTING
DATE

Every 18 mos.

BUDGET:

TOTAL DOLLARS

MAN YEARS

~~XXXXXX~~

CURRENT YEAR

~~XXXXXX~~

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR

WORK ☒

PROGRAM

SPECIAL

MINISTRY ☐

FUNDING

JOINTLY

FUNDED ☐

PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Yes - part of "Water Resources Map" series

PARTICIPATION BY OTHER MINISTRIES:

Nil

REMARKS:

Published reports to date include the following counties: Lambton, Kent, Essex, Elgin, Brant and Haldimand. Work is progressing on Norfolk (part of Haldimand-Norfolk Municipality) and Peel.



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology & Monitoring Section DATE: June 1, 1977

PROJECT TITLE:

Mapping of Major Aquifers in Ontario.

KEY WORDS:

Aquifers; hydrogeology; ground-water mapping

PRINCIPLE INVESTIGATOR

AND AFFILIATION

U. Sibul, Head, Resource Assessment Group

LIAISON OFFICER

OR SUPERVISOR

as above

RESEARCH

CATEGORY:

INTERNAL

GRANT

X

—

UNSOLICITED CONTRACT

—

MULTI-YEAR PROJECT

X

SOLICITED CONTRACT

—

CONCURRENT PROJECT

—

OBJECTIVE:

To map the location and extent of major aquifers in Ontario.

DESCRIPTION:

The maps are intended to provide basic ground-water data and interpretations of aquifer extents on which large-scale water supply potentials can be approximated. The project involves compiling and analysing ground-water data in order to determine the location and extent of major aquifers in the Province.

DURATION
OF PROJECT

ON-GOING

— YEARS

PRESENT

YEAR IS

— YEAR

REPORTING
DATE

EVERY 10-12

MONTHS

BUDGET:

TOTAL DOLLARS

MAN YEARS

~~TOTAL PROJECT~~

CURRENT YEAR

~~TOTAL PROJECT~~

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR

WORK X

PROGRAM

SPECIAL

MINISTRY —

FUNDING

JOINTLY

FUNDED —

PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes - in form of aquifer maps.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Some of the major aquifers in the Province which will be mapped include: the Alliston Complex; the Oak Ridges Complex; Guelph (Lockport) Amabel; Kitchener-Waterloo Complex; Woodstock and Nepean aquifers. Others are yet to be identified.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources - Hydrology & Monitoring Section DATE: June 1, 1977

PROJECT TITLE:

Drainage Basin Inventory Studies

KEY WORDS:

Basins; water resources inventory; water management; land use planning.

PRINCIPLE INVESTIGATOR

AND AFFILIATION

U. Sibul, Head, Resource Assessment Group

LIAISON OFFICER

OR SUPERVISOR

as above

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT —

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the inventory of surface and ground-water resources, both quantity and quality, in drainage basins in Ontario.

DESCRIPTION:

The basin inventories are designed to provide baseline water resources, ^{data} and interpretation publications for future planning and water resources management in Ontario. The studies are designed to ultimately cover all of the Province on the drainage basin scale. The project involves intensive surface and ground-water data gathering and analyses to determine the integrated water resources in drainage basins. Major water uses and management alternatives are described.

DURATION
OF PROJECT

ON-GOING

____ YEARS

PRESENT

YEAR IS

____ YEAR

REPORTING
DATE

EVERY 18 months

BUDGET:

TOTAL DOLLARS

~~XXXXXX~~

CURRENT YEAR

MAN YEARS

~~XXXXXX~~

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

Every 18 months (approx.) "Water Resources Report" series

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

4 existing publications are for the following drainage basins:

Big Otter Creek; Big Creek; Upper Nottawasaga River; Moira River.

Work is presently being carried out in the Duffins-Rouge, South Nation and the Holland-Black River basins.



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology & Monitoring Section DATE: June 1, 1977

PROJECT TITLE:

Flowing Wells in Ontario.

KEY WORDS:

Flowing wells; aquifers; hydrogeology

PRINCIPLE INVESTIGATOR

AND AFFILIATION

U. Sibul, Head, Resource Assessment Group

LIAISON OFFICER

OR SUPERVISOR

as above

RESEARCH

CATEGORY:

INTERNAL X

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT X

CONCURRENT PROJECT —

OBJECTIVE:

To map all flowing wells in Ontario and provide these data to water-well drillers and others interested in ground-water development and management.

DESCRIPTION:

The project consists of mapping the locations of all known flowing wells in Ontario, and providing these data in the form of maps, to all licensed water-well drillers in the Province. The maps are designed to assist water-well drillers in anticipating flowing conditions prior to drilling. With proper well construction, flowing wells can be controlled to avoid unnecessary depletion of ground-water resources and to prevent drainage problems often associated with uncontrolled flowing wells.

DURATION
OF PROJECT

CONTINUING
____ YEARS

PRESENT
YEAR IS _____ YEAR

REPORTING
DATE _____ ONGOING

BUDGET:

TOTAL DOLLARS

MAN YEARS

~~XXXXX PROJECT~~ CURRENT YEAR

~~XXXXX PROJECT~~ CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED? Reports in the form of maps are prepared throughout the project.

PARTICIPATION BY OTHER MINISTRIES:

NIL

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology & Monitoring

DATE: June 1, 1977

PROJECT TITLE:

Evaluation of the Long Term Impact of Pollutants in Ground Water

KEY WORDS:

Hydrogeology: Ground Water Contamination; Subsurface contaminants

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. G. Hughes, Chief, Ground Water Protection Unit

LIAISON OFFICER

OR SUPERVISOR as above

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To examine the long-term impact of contaminants in ground-water flow systems in order to allow for the development of Ministry policies relating to the prevention and clean up of leaks, spills, etc., in hydrogeologically sensitive areas.

DESCRIPTION:

At the present time it is often difficult to quantify the impact of leaks and spills of refined hydrocarbons, the presence of unprotected sand/salt storage facilities, and the occurrence of accidental spills of chemicals, etc., on areal ground-water conditions because of the nature and speed of contaminant movement in the subsurface and the complexities of local hydrogeology. In order to be able to have meaningful policies and guidelines adopted to control the above-mentioned contaminating factors, it is necessary to promote an understanding of the long-term potential of the problem through careful documentation.

DURATION OF PROJECT	Continuing _____ YEARS XXXXX	PRESENT YEAR IS	_____ YEAR	REPORTING DATE	Ongoing
------------------------	--	--------------------	---------------	-------------------	---------

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	XXXXXX	CURRENT YEAR	XXXXXX	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>
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IS A REPORT ANTICIPATED? Reports are prepared on various projects, project aspects and case histories as work progresses.

PARTICIPATION BY OTHER MINISTRIES:

Involved on MTC Contamination Committees and in liaison with Consumer and Commercial Relations and most hydrogeological consultants outside the MOE.

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources - Hydrology & Monitoring

DATE: June 1, 1977

PROJECT TITLE:

Task C Studies - Pollution from Land Use Activities Preference Group (IJC)

KEY WORDS:

IJC; PLUARG; Great Lakes Water Quality; non-point pollution; land use

PRINCIPLE INVESTIGATOR

AND AFFILIATION

F. C. Ostry, Head - Technical Support Group

LIAISON OFFICER

OR SUPERVISOR

F. C. Hore, Supervisor - Hydrology & Monitoring Section

RESEARCH

CATEGORY:

INTERNAL ☒

GRANT ☒

UNSOLICITED CONTRACT ☐

SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☒

CONCURRENT PROJECT ☐

50% Federal Funding under IJC

OBJECTIVE:

Under Task C of PLUARG, to examine the effects of various land uses and their associated pollutants on Great Lakes water quality. This study primarily deals with non-point pollution sources.

DESCRIPTION:

The role of the Hydrology and Monitoring Section has been to establish and maintain a network of water quantity and water quality stations primarily in the Grand and Saugeen rivers and below selected agricultural watersheds to assist in examining the effects of runoff from various land uses including agriculture, urban, extractive industries, transportation and utility corridors, sanitary landfills, sewage sludge and spray irrigation, etc. The examination will result in a final Task C report to PLUARG delineating the extent of pollutant contribution, the relative significance of sources and practices, the degree of transmission of pollutants to boundary waters and possible remedial measures.

DURATION
OF PROJECT

4

YEARS

PRESENT
YEAR IS

4th

YEAR

REPORTING
DATE

1978

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☐
PROGRAM

SPECIAL
MINISTRY ☒
FUNDING

JOINTLY
FUNDED ☒
PROJECT

OTHER ☐

50% Federal Funding through IJC

IS A REPORT ANTICIPATED?

Final report anticipated - end of 1978

PARTICIPATION BY OTHER MINISTRIES:

Ont. Ministry of Agriculture & Food; Canada Dept. of Agriculture; Canada Dept. of Forestry plus contracts to consultants and universities.

REMARKS:

* - Does not include L & T & Laboratories.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology & Monitoring

DATE: June 1, 1977

PROJECT TITLE:

APPLICATION OF GEOPHYSICAL TECHNIQUES TO GROUND WATER STUDIES

KEY WORDS: ground-water exploration; ground-water contamination;
GEOPHYSICS, remote sensing, seismic exploration; ~~electrical resistivity~~
PRINCIPLE INVESTIGATOR exploration.
AND AFFILIATION Dr. E. Rodrigues, Chief, Geotechnical Services Unit

LIAISON OFFICER
OR SUPERVISOR as above

RESEARCH CATEGORY: INTERNAL X UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X
GRANT — SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To enhance the application of geophysical techniques to ground-water supply and contamination studies in order to develop geophysics as an inexpensive method for subsurface hydrogeologic investigations.

DESCRIPTION:

As labour costs escalate, making the installation of test holes and test borings for ground-water exploration and contamination studies uneconomical, the use of geophysical techniques as a means of carrying out subsurface investigations is being increased. It is also anticipated that existing geophysical techniques can be developed to aid in the tracing of contaminant plumes and defining soil attenuating capacities. This work is part of the continuing service function of the Geotechnical Services Unit.

DURATION OF PROJECT Continuing ~~YEARS~~ PRESENT YEAR IS — YEAR REPORTING DATE Ongoing

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT ~~XXXXXXXXXX~~ CURRENT YEAR TOTAL PROJECT ~~XXXXXXXXXX~~ CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK X PROGRAM SPECIAL MINISTRY — FUNDING JOINTLY FUNDED — PROJECT OTHER —

IS A REPORT ANTICIPATED?

Reports are prepared on various projects and aspects as work progresses.

PARTICIPATION BY OTHER MINISTRIES:

A service function primarily to Regional Staff; however requests for assistance

REMARKS: from MTC, DOE and universities are answered.



BRANCH: Water Resources

1976/77 PROJECTS

DATE:

PROJECT TITLE: Lake Restoration

KEY WORDS: Lake, Management, Weed Harvesting, Destratification, Nutrient Inactivation

PRINCIPLE INVESTIGATOR I. Wile
AND AFFILIATION G. Robinson

LIAISON OFFICER I. Wile
OR SUPERVISOR G. Robinson

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop techniques for reclamation and management of lakes and ponds.
(a) Aquatic weed harvesting
(b) Destratification of lakes
(c) Nutrient Inactivation

DESCRIPTION:

(a) Aquatic weeds are removed from a large area of Lake Chemung to improve aesthetics, fishing and to control eutrophication by removing plant nutrients.

(b) Three lakes are under intensive study to determine the effects of destratification on water quality and fish production.

(c) Three ponds are being treated with alum to inactive phosphorus and reduce algae. Ministry of Natural Resources conduct fishery studies.

DURATION OF PROJECT continuing ~~YEARS~~ PRESENT YEAR IS ☐ YEAR REPORTING DATE ☐

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK ☒ PROGRAM SPECIAL MINISTRY ☐ FUNDING JOINTLY FUNDED ☐ PROJECT OTHER ☐

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

A joint project with Ministry of Natural Resources

REMARKS:



BRANCH: Water Resources

DATE:

PROJECT TITLE:

Utilization of Aquatic Plants

KEY WORDS:

Aquatic Weeds, Compost, Animal Feeds

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Mr. J. H. Neil, Limnos Ltd.

LIAISON OFFICER
OR SUPERVISOR

Mrs. I. Wile for the Ministry
Limnos Ltd. supervises the contract

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☐

UNSOLICITED CONTRACT ☐
SOLICITED CONTRACT ☒

MULTI-YEAR PROJECT ☐
CONCURRENT PROJECT ☐

OBJECTIVE:

To find uses for aquatic plants as animal feed and compost.
All work is being done at the University of Guelph.

DESCRIPTION:

Aquatic plants are prepared for feeding trials with cattle.
Extensive analyses of the plants are carried out and the
conversion rate is determined for the test animals. Compost
is prepared and some plants are grown in it to test
nutritive value and ultimate economic value.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR ☒
WORK
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED OTHER
PROJECT

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE:

PROJECT TITLE:

pH Correction in Acid Lakes

KEY WORDS:

pH, Lakes, Acidity, Neutralization, Fishery

PRINCIPLE INVESTIGATOR
AND AFFILIATION

N. Yan

LIAISON OFFICER
OR SUPERVISOR

P. Dillon

N. Yan

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To chemically correct the pH in acid lakes and to establish a food chain capable of supporting a fishery. Work is carried out in the Sudbury area.

DESCRIPTION:

The pH is adjusted with lime and calcium carbonate. Nutrients are being added to stimulate phytoplankton and higher organisms are under study and will be stocked if required.

DURATION
OF PROJECT

5 YEARS

PRESENT
YEAR IS

____ YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR ☒
WORK PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Natural Resources is doing fish studies.

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Water Resources

DATE:

PROJECT TITLE:

Lakeshore Capacity

KEY WORDS:

Lakes, Development, Capacity Limits

PRINCIPLE INVESTIGATOR
AND AFFILIATION

P. Dillon
W. Scheider

LIAISON OFFICER
OR SUPERVISOR

P. Dillon
W. Scheider

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To quantify the effects of lakeshore development on lake water quality.

DESCRIPTION:

Several developed and undeveloped lakes are being surveyed to define water quality and nutrient budgets. Changes will be made on the undeveloped lakes to simulate various aspects of development in order to measure the effects on water quality.

DURATION
OF PROJECT

5 YEARS

PRESENT
YEAR IS

— YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER X
Housing

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Although 3 other aspects are under study by the Laboratory and the Ministry of Natural Resources.



BRANCH: Water Resources

DATE:

PROJECT TITLE:

Pesticides and Metals in Great Lakes Fish

KEY WORDS:

Pesticides, Metals, Fish

PRINCIPLE INVESTIGATOR
AND AFFILIATION

G. Craig, Limnology and Toxicity Section,
Water Resources Branch.

LIAISON OFFICER
OR SUPERVISOR

G. Craig

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

This is a PLUARG study to determine the effects of
pesticides and metals from rivers on fish in Great
Lakes.

DESCRIPTION:

The project includes data collection and tabulation and
collection of more data if required.

DURATION
OF PROJECT

2
— YEARS PRESENT
YEAR IS — YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED IJC OTHER —
PROJECT

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Source Separation Study

KEY WORDS:

Source Separation, Garbage, Recycling

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Jim Gilbert

LIAISON OFFICER
OR SUPERVISOR

Jim Gilbert

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the best methods for the collection of recyclable materials separated by the household from residential waste.

DESCRIPTION:

Examines the strengths and weaknesses of existing and past projects, both from the literature and in the field, in order to devise an effective action research program in pilot localities in Ontario. This includes the development of common accounting procedures, and the collection of the paper, glass and metal fractions.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2nd YEAR

REPORTING
DATE

1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF Waste
FUNDS: Management
Advisory Board
~~Operating Budget~~

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Joint project of Waste Management Advisory Board and Resource Recovery Branch. This report should therefore be read in conjunction with reports on associated pilot studies to be carried out in 1977 by the Resource Recovery Branch.



Ontario

BRANCH:

Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Float-Equity Systems for Standard Refillable Soft
Drink Containers

KEY WORDS:

Soft Drink Packaging - Standard Refillable Bottles

PRINCIPLE INVESTIGATOR

AND AFFILIATION Peat Marwick & Partners, Management Consultants

LIAISON OFFICER
OR SUPERVISOR

Professor M. J. Hare

RESEARCH
CATEGORY:

INTERNAL —

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —X

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To define and evaluate the alternative mechanisms for
the equitable return of the float of bottles to the
bottlers in a fully standard refillable bottle system
in the soft drink industry in Ontario.

DESCRIPTION:

Options covering the use of central warehousing, depots,
and proprietary shells handled by retailers are considered
in the light of assessment criteria that incorporate float
characteristics, handling and distribution factors, and
the impact of the proposed changes on the consumer, retailer
and bottler.

DURATION
OF PROJECT

1/2

YEARS

PRESENT

YEAR IS

-

YEAR

REPORTING

DATE

March 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

Not known

SOURCE OF
FUNDS:

REGULAR

WORK —X

PROGRAM

SPECIAL

MINISTRY —

FUNDING

JOINTLY

FUNDED —

PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes, dated March 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

BRANCH:

Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Urban Solid Waste Generation in Ontario -
Report no. 1 of the Waste Indices Subcommittee

KEY WORDS:

Solid Waste Generation in Ontario

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Professor M. J. Hare

LIAISON OFFICER
OR SUPERVISOR

J. W. Gilbert

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To develop reliable per capita generation figures for residential, commercial, and industrial wastes collected and disposed of by municipalities and private agencies across the province.

DESCRIPTION:

This is the first phase of a comprehensive study to develop a system for measuring the total amount of urban solid waste generated in Ontario, its constitution by separable fractions, the costs of collection and disposal in dollars, energy, labour and social terms, and the subsequent implementation and monitoring of the system as a means of assessing waste management performance.

DURATION
OF PROJECT

1/2 YEARS

PRESENT
YEAR IS

Final YEAR

REPORTING
DATE

August 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes, dated August 1976

PARTICIPATION BY OTHER MINISTRIES:

-

REMARKS:



BRANCH: Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Wine and Spirits Packaging in Ontario

KEY WORDS:

Wine and Spirits

PRINCIPLE INVESTIGATOR

AND AFFILIATION Stevenson & Kellogg Ltd., Management Consultants

LIAISON OFFICER

OR SUPERVISOR Professor M. J. Hare

RESEARCH
CATEGORY:

INTERNAL —

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —~~X~~ —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To identify the means of reducing the adverse environmental impacts of wine and spirits packaging, including their contribution to solid waste and litter and resource/energy depletion.

DESCRIPTION:

A comprehensive assessment of the environmental economic and other factors associated with different possible container types and end-use systems for wine and spirits packaging in Ontario. The end-use systems analysed were disposal, recycling (return to L.C.B.O. depots) and re-use. The study presents a unique assessment of the relative environmental, physical, health and other attributes for ten possible container types.

DURATION
OF PROJECT

1½ YEARS

PRESENT
YEAR IS

Final YEAR

REPORTING
DATE October 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR X
WORK PROGRAM

SPECIAL
MINISTRY FUNDING

JOINTLY
FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED?

Yes, dated October 1976

PARTICIPATION BY OTHER MINISTRIES:

L.C.B.O.

REMARKS:



Ontario

BRANCH: Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Evaluation of Ontario Regulation 687/76

KEY WORDS:

Soft Drink Packaging Regulations

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Mr. R. H. Woolvett, Chairman, Waste Management Advisory Board

LIAISON OFFICER
OR SUPERVISOR

P. J. Crabtree

RESEARCH
CATEGORY:

INTERNAL ☒ GRANT ☐

UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐
MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To summarize the submissions from interested parties in connection with the provisions of Ontario Regulation 687/76, as they relate to the packaging and sale of carbonated soft drinks in Ontario.

DESCRIPTION:

The report reviews the intent of Ontario Regulation 687/76, and concludes that it will generally achieve its objective. Further recommendations of the Board on the issues of standard refillable bottles (their introduction and specifications), the banning of non-refillable bottles and the introduction of a tax or deposit or ban on cans are presented.

DURATION
OF PROJECT

1/4 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

December 1976

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Yes, dated December 1976

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

BRANCH:

Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Environmental Impact Study of Fluid Milk Containers

KEY WORDS:

Milk, Environmental Impacts

PRINCIPLE INVESTIGATOR

AND AFFILIATION Giles Endicott, Research Associate with W.M.A.B.

LIAISON OFFICER

OR SUPERVISOR P. J. Crabtree

RESEARCH

CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop policy recommendations which will reduce the adverse environmental impacts associated with milk packaging.

DESCRIPTION:

The weight, volume of waste, and energy use are being determined and compared in absolute terms and per unit of milk delivered. Sales trends by container types are being examined. Photo-degradation of nutrients will be considered and recommendations made. A report will be made to the Minister of the Environment in time to affect metric conversion slated for July 1978.

DURATION
OF PROJECT

1½ YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF Waste Mgmt.
FUNDS: Advisory Board
Operating Budget

REGULAR ☒
WORK ☐
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐ OTHER ☐
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Consultation with Agriculture and Food, and Health.

REMARKS:



BRANCH: Waste Management Advisory Board

DATE: March 31, 1977

PROJECT TITLE:

Impacts of Standard Refillable Soft Drink Bottles

KEY WORDS:

Soft Drink Packaging, Standard Refillable Bottles

PRINCIPLE INVESTIGATOR

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RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT X

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To determine the receptiveness of the bottling industry to the voluntary usage of standard refillable bottles, the equipment requirements, the adaptability of existing shells, the time period for implementation and the problems associated with mandatory usage of standard refillable bottles for carbonated soft drinks in Ontario.

DESCRIPTION:

The majority of the province's 63 bottling companies and five retail organizations were contacted, and information collected and tabulated on their attitudes to the proposed changes and their equipments costs to effect the changes.

The report only considers the factors involved when a fully refillable non-standard system is being converted to a fully refillable standard one and does not take into account the equipment adjustments associated with the substitution from non-refillable containers to proprietary refillable bottles which is presently occurring in Ontario.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

March 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes, dated March 1977

PARTICIPATION BY OTHER MINISTRIES:

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